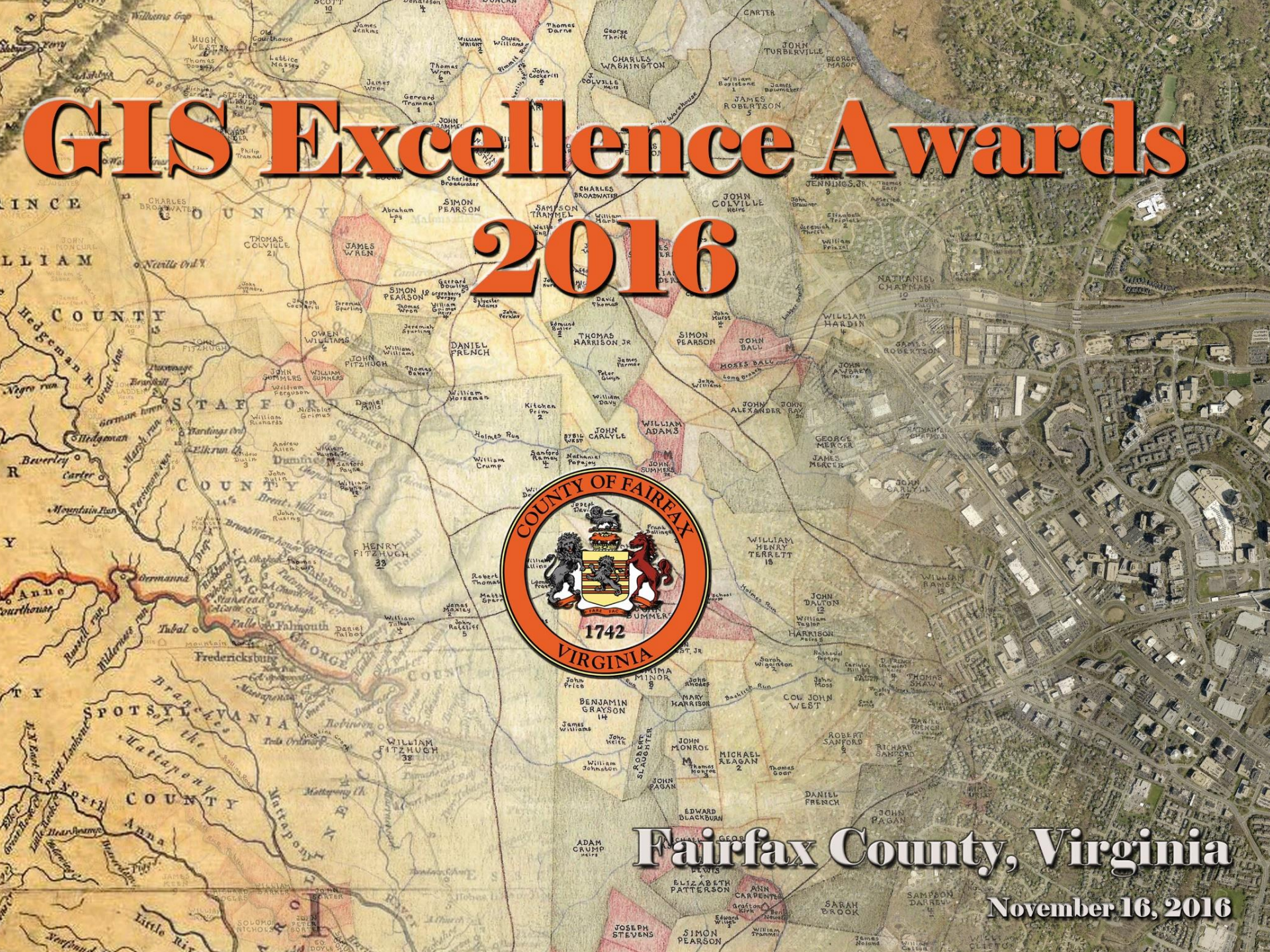

GIS Excellence Awards
2016
COUNTY OF FAIRFAX
1742
VIRGINIA
Fairfax County, Virginia
November 16, 2016

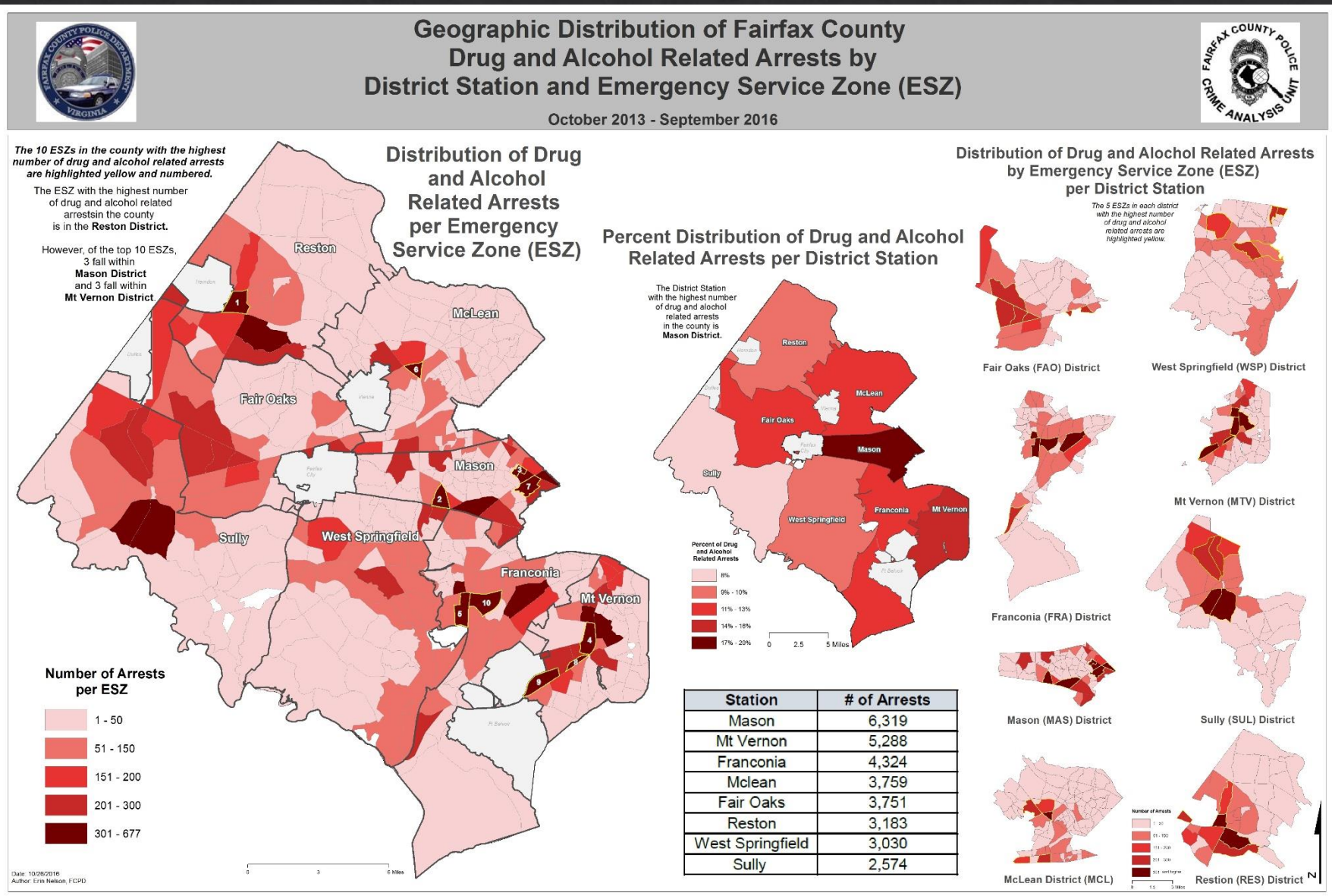
CARTOGRAPHIC CATEGORY

Third Place

Geographic Distribution of Drug and Alcohol Related Arrests

Erin Nelson

Police Department



Station	# of Arrests
Mason	6,319
Mt Vernon	5,288
Franconia	4,324
Mclean	3,759
Fair Oaks	3,751
Reston	3,183
West Springfield	3,030
Sully	2,574

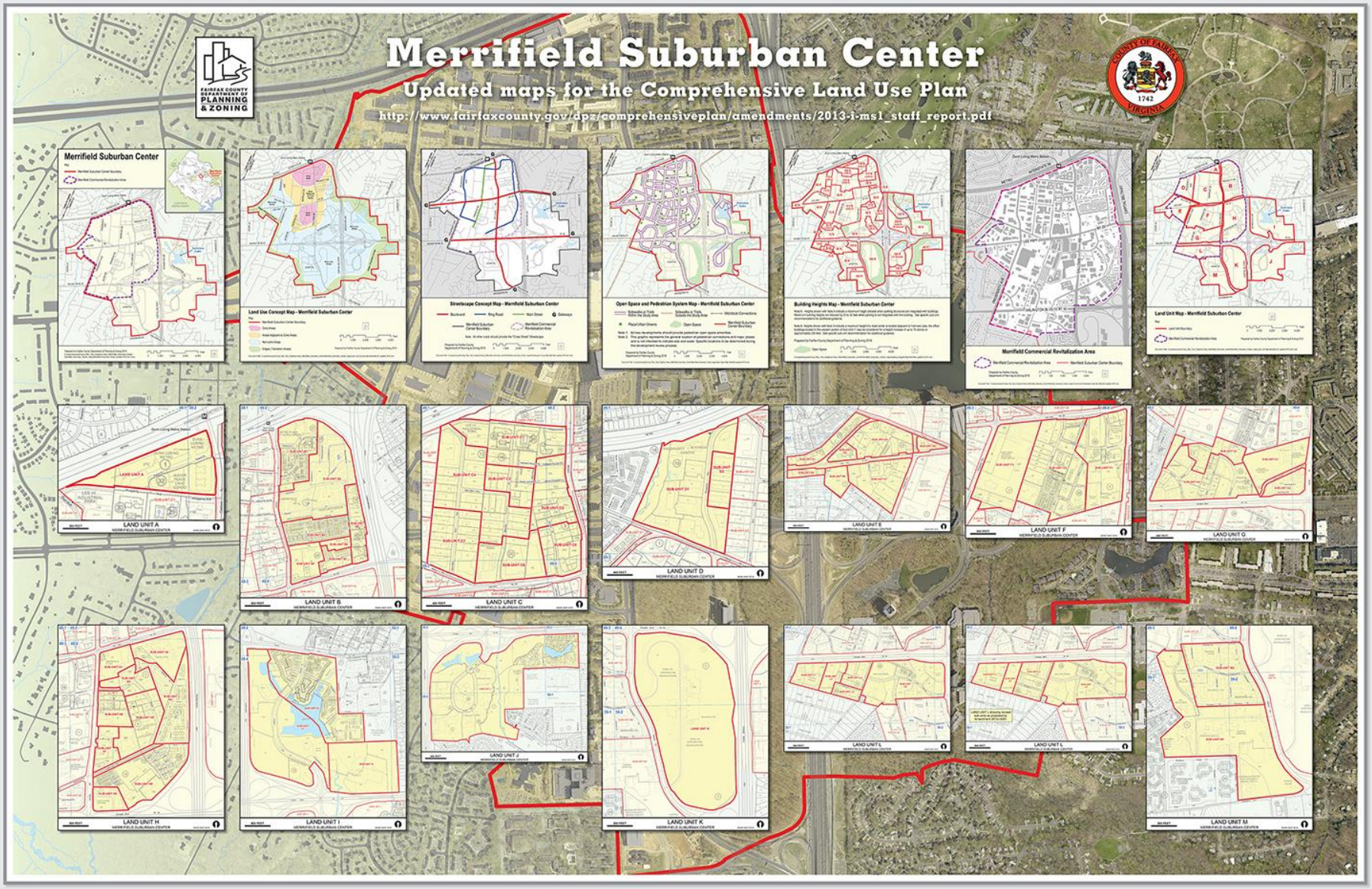
CARTOGRAPHIC CATEGORY

Second Place

Merrifield Suburban Center-Updated maps for the Comprehensive Land Use Plan

Harry Rado

Department of Planning and Zoning



Comprehensive Plan Amendment

Merrifield Suburban Center

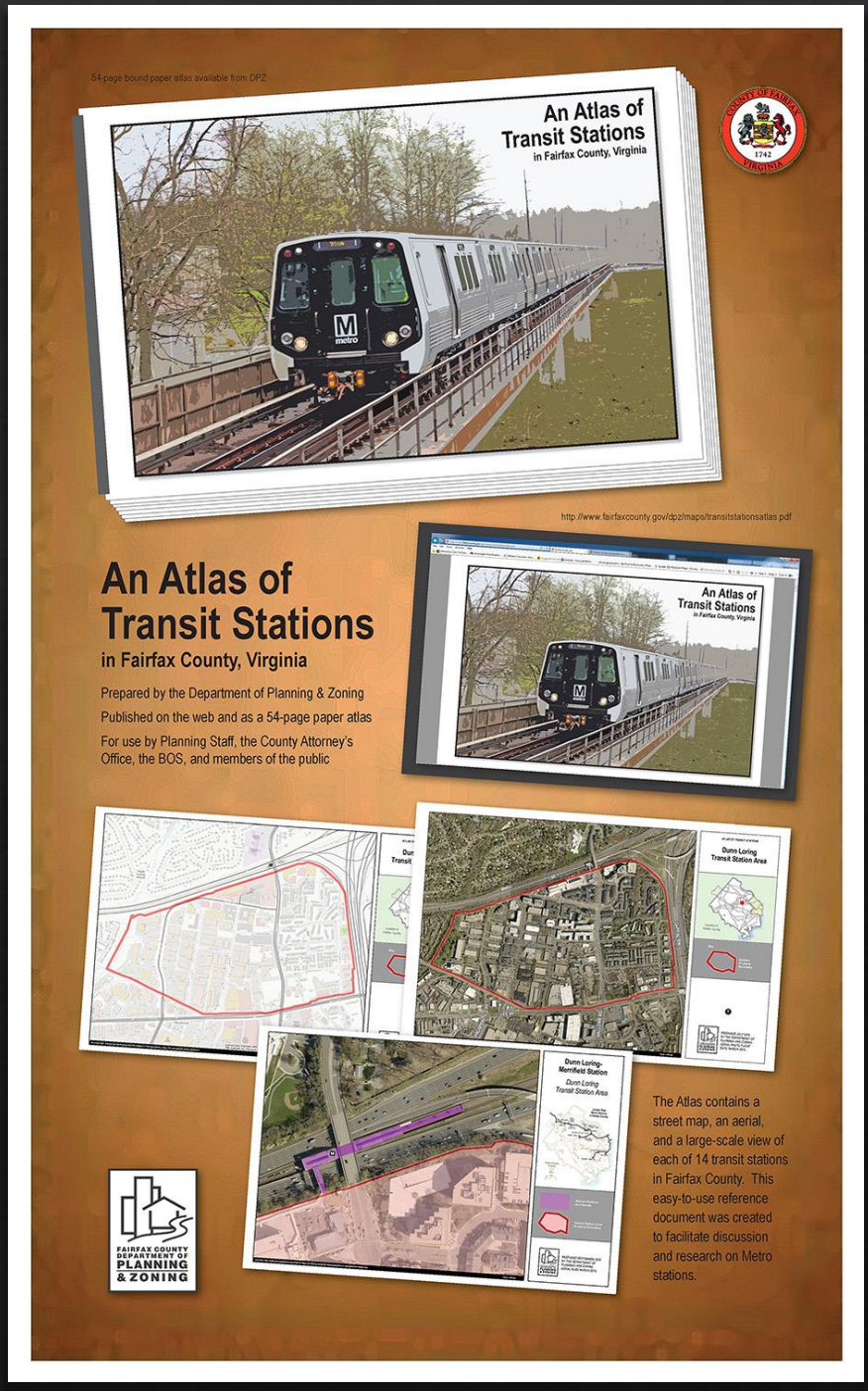
CARTOGRAPHIC CATEGORY

First Place

An Atlas of Transit Stations in Fairfax County, Virginia

Harry Rado

Department of Planning and Zoning



An Atlas of Transit Stations

ANALYTIC CATEGORY

Third Place

A GIS Based Valve Exercise Program

Maria Nieves, Gennady Mogilevich

Fairfax Water

Fairfax Water GIS BASED VALVE EXERCISE PROGRAM

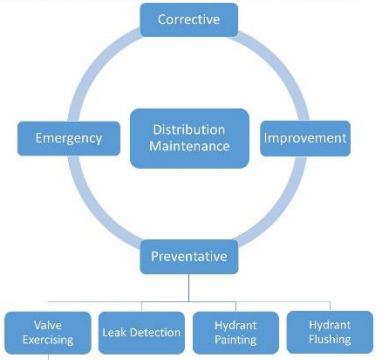
Importance of a Valve Exercise Program

Fairfax Water Strategic Plan – 2020

Goal 3: Infrastructure Integrity

Strategy C: Maintain a robust asset management program to ensure a sustainable distribution system that meets service level objectives.

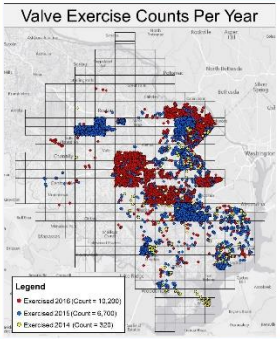
Action Item 3: Formalize and refine distribution asset management programs, such as valve exercise.



BENEFITS:

- ✓ Identify and repair mechanically deficient valves in non-emergency setting
- ✓ Locate and uncover buried valves
- ✓ Improve GIS data, including unmapped or non-existent valves
- ✓ Reduce frequency of atypical shutdowns
  - Decreased repair time
  - Lower number of customers out of service
  - Minimize damages due to failure

Valve Exercise Counts Per Year



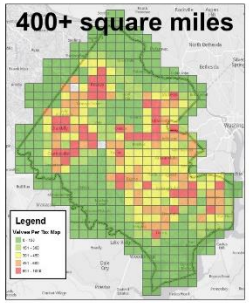
- Improved data quality and consistency since implementation of a GIS based approach
- Increased productivity as field-users become more familiar with application
- 2014 Statistics highlight deficiencies in previous valve exercise approaches
  - Work Orders assigned at tax map level, few individual records for assets
  - Individual asset records often had poor data due to free text fields
- Follow up work:
  - 2015 – 441 requests
  - 2016 – 1,097 requests
  - 504 cannot locate requests

Challenges and Evaluation of Alternatives

Geographic ↔ **Data**

Challenges

Institutional



- Over 110,000 valves requiring O&M
- GIS feature data constantly changing
- Consolidation of data across all valve exercise activity to avoid redundancy in Valve Exercise Program

Maintenance Type	Valves Exercised 2015
Emergency	1,200
Corrective	900
Improvement	1,100
Preventative	6,100

Field user preferences

- Single map-based interface
- iOS compatibility
- Multiple concurrent users
- Easy to use offline functionality

Possible field data collection solutions:

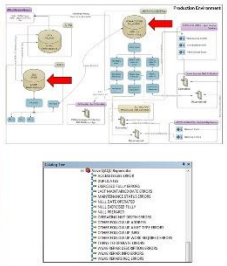
- Microsoft Excel (with hard copy maps)
- SharePoint (with hard copy maps)
- Custom developed solution
- Collector for ArcGIS

Preferred Solution and Implementation

Data Collection	Data Maintenance	QC	Reporting
Collector for ArcGIS	ArcGIS Desktop	ArcGIS Desktop, Data Reviewer	Work Order Management, Web App Builder, Operations Dashboard

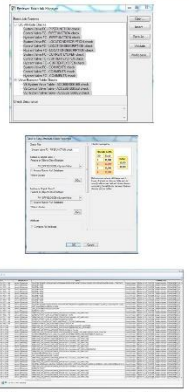
Collector for ArcGIS provides a single application that fully integrates the map and data collection interface. This enables location based zoom to functionality and map based selection processes that initiate the forms used to collect the desired data stored within the GIS. On the Valve Exercise map features are color coded based on simple symbology indicating collection status. The collection forms are configurable via the feature class attributes and the valve exercise tables. Configuration includes what fields are viewable and whether they are editable or not. The Valve Exercise map was fully developed and is fully maintained via in-house resources.

Data collection is supported via both online and offline workflows. Online updates are visible immediately through the enterprise by other end users. Offline data must be downloaded first to the data collection device and then synched once the collection is completed and the device is back online.



Fairfax Water has a set of robust data maintenance workflows that facilitates the movement of data throughout the enterprise. End users access these data via different applications and different access points within the Enterprise. Often maintenance activities are triggered by information found in the field. The Valve Exercise Collector map allows field staff to identify map and data related issues through their normal work functions and communicate those issues back to the GIS Technicians responsible for the maintenance of the Enterprise databases.

Queries within ArcGIS desktop help identify possible non-GIS data entry errors through a desktop mapping interface (i.e., incomplete or conflicting data entry marked complete, but no maintenance date). These queries are run via tools accessible through ArcGIS Toolbox. The results can be exported and sent to field staff for correction.



Data Reviewer checks are run by a GIS Analyst using ArcGIS Desktop. They populate a table for further review based on specific criteria of field data changes (i.e., a change in pipe diameter or material). The resulting table is used by the GIS Technicians to confirm the difference through several methods at their disposal. These checks help ensure a high level of data quality before changes are replicated for all end-users to view.

Using ModelBuilder a set of scripts were developed and run in batch mode to export data to text file format for importing into SAP (Fairfax Water's Work Order management system). Once consumed by SAP, notifications are created and distributed as appropriate. This was a cost effective way to implement a useful form of GIS-SAP integration. Staff appreciate that they don't have to open a second app and enter redundant data.

A web map is used to assist supervisory level staff with gathering statistics focused on valve exercise status over a specific period time and area. Built in queries assist the end-user with displaying data at several different granularities. Queries can be run against all valves, or specific valve layers, and display valves by status, date, or area of responsibility. Additionally, this web map enables staff to better tie back the location of work being done with customer inquiries.

The Operations Dashboard provides a different method for viewing/analyzing valve exercise statistics. It can be used with or in place of the web app builder reporting map. Unlike the web app builder, the Operations Dashboard requires an ArcGIS organizational account.

ANALYTIC CATEGORY

Second Place

Creating Back-up Dispatch Run Orders for Computer Aided Dispatch (CAD)

Katherine Good, Christopher McCarthy

Fire and Rescue Department, Public Safety Communications

Creating Back-up Dispatch Run Orders for Computer-Aided Dispatch (CAD)

Objective:

Under all conditions, CAD must be able to dispatch the closest appropriate public safety vehicle. Run orders are the list of units or fire stations in the order that they would be dispatched to a given place.
In addition to having the fire station run orders in the CAD system as a back-up, there are printed hardcopy books for immediate reference during system maintenance, testing, and drills.

Benefits to Fairfax County:

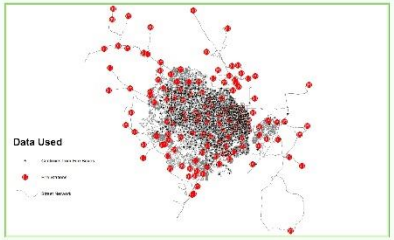
- Efficency: Eliminates need for a separate software package.
- Money: Saves software maintenance fees.
- Time: Quicker data preparation and final list turn around.

Previously, extensive data prep was involved to send data to a vendor. The vendor took from a week to a month to send the results back packaged in separate software. Then the data results were reviewed and often returned to the vendor. Typically the time involved was several months before the final list was available. Now simple changes can be made in under an hour.

This is a joint project between the Fire and Rescue Department (FRD) and the Department of Public Safety Communications (DPSC).

Data Sets Involved:

- Street network (94,771 street records) – created internally after each CAD data lockdown).
- Fire stations (155 records) – maintained by the Fire Department.
- Centroid points (1,131 records) one for each area - created from the Fire Department's Fire box data.



Basic Steps:

1. Create and maintain data sets (shared process between DIT-GIS and FRD).

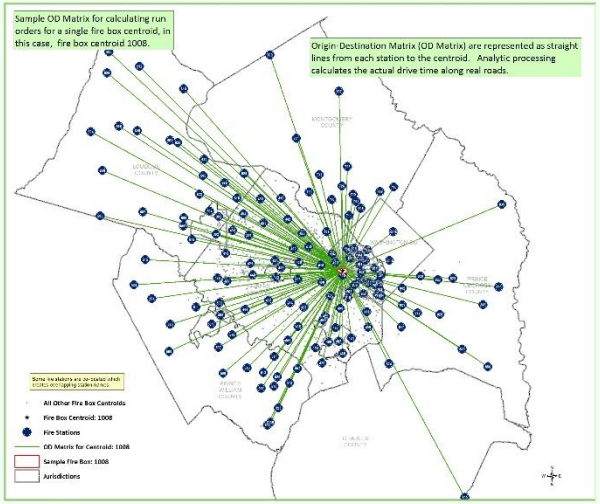
2. Run Origin-Destination matrix solver from a python script. Using Esri's Network Analyst extension and the Origin-Destination Matrix tool, we calculate the travel time from each fire station to each fire box centroid. For each centroid point, the fire station names are ordered from the least time to the most time, in other words, the order that the 911 dispatcher would use for an emergency.
In an iterative fashion, each centroid is run and the results recorded.

3. Create ouput table and format it to be loaded into CAD.

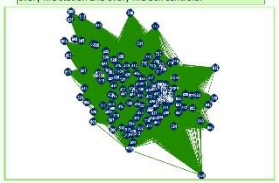
Python Script

Sample OD Matrix for calculating run orders for a single fire box centroid, in this case, fire box centroid 1008.

Origin-Destination Matrix (OD Matrix) are represented as straight lines from each station to the centroid. Analytic processing calculates the actual drive time along real roads.

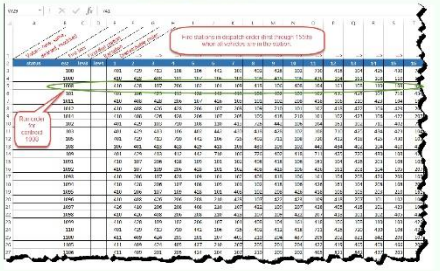


Complete OD Matrix. There is a representative line between every fire station and every fire box centroid.



Selection for fire box centroid 1008 from the complete OD Matrix table. Fire stations are ranked according to total driving time. 155 fire stations times 1131 centroids equals a total of 175,305 records in the OD Matrix attribute table.

Final output for CAD.



Joint Project between Departments of Public Safety Communications (Chris McCarthy) and Fire and Rescue (Keg Good). 2016.

ANALYTIC CATEGORY

First Place

Using GIS to Identify Optimal Placement of Incident Management Officers

Shelby Zelonis

Fire and Rescue Department

USING GIS TO IDENTIFY OPTIMAL PLACEMENT OF INCIDENT MANAGEMENT OFFICERS

Background:

Recently, the Fire and Rescue Department (FRD) identified a need for Incident Management Officers (IMOs). IMOs provide assistance to Battalion Chiefs during complex incidents.

In 2016, FRD applied for a grant that would allow us to staff 4 of the 7 Battalion Chiefs in the county with IMOs.

The Question:

Which 4 of the 7 stations with Battalion Chiefs should we choose for IMO placement?

Things we had to consider:

- Call volume
- Response times
- Existing Battalion Chief coverage
- Existing EMS Captain coverage (EMS Captains currently serve as Battalion Chief assistants when needed)

The Solution!

ArcGIS Desktop's Network Analyst extension provides a great tool - Location-Allocation - to solve this exact problem. We identified 4 stations for IMO placement: Stations 9, 21, 29, and 32.

Read more about the details on the right!

Methods

1. Choose candidate stations, identify where demand is located.

For this analysis, we used the Location-Allocation solver available as part of Network Analyst.
We had to choose candidate facilities (stations that are able to be chosen for IMO placement). These were defined as the 7 stations with existing Battalion Chiefs (8, 9, 21, 25, 29, 32, and 37).

The EMS Captain stations were also included as facilities to represent existing coverage for the IMO position. However, the EMS Captain stations were not allowed to be selected as candidates for new IMO placement.

We also had to choose demand points. Since our demand is where our incidents are, we chose the the CY 2015 response data points (incidents locations and all unit responses to them).

Left: Fairfax County Fire Stations.

Red = Battalion Chief station (candidate facilities)

Blue = EMS Captain stations (required in the analysis but not considered candidates)

Black = all other stations

2. Consider incident type - where are the calls that IMOs will be needed on?

We ran the analysis multiple times, each time using a different criteria based on the CY2015 incidents. We considered IMO coverage to a combination of the following scenarios:

- All incident types
- Structure fires only
- Incidents where at least one Battalion Chief was required
- Incidents were at least two Battalion Chiefs were required
- Incidents where at least one Battalion Chief actually responded on-scene
- Incidents where at least two Battalion Chiefs actually responded on-scene

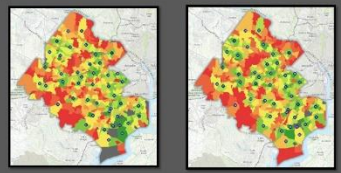
Left: Example of a solved location-allocation analysis. Pink lines denote all allocated demand points that a chosen facility (yellow) can reach within a set cutoff time or distance. Image credit: Esri

3. Incorporate response times

Pure spatial coverage to incidents is important, but so are other variables. We had to consider - where do we have trouble meeting response time goals? These are areas where an IMO would be most useful.

To incorporate response times, we ran all of the scenarios from Step #2 again, incorporating actual response times as weights.

If an incident response time was high, coverage to that incident was prioritized over one with a low response time.



All Hazards (left) and EMS (right) response times for CY2015, by fire box. Red = higher response times, Green = lower response times

Results & Recommendations

Where should we put our IMOs?

When considering all incidents, Station 9, 21, 29, and 32 were selected most often for IMO placement.

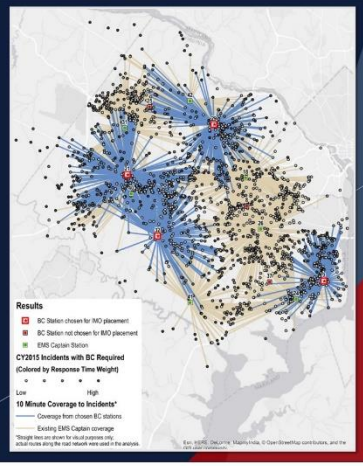
When considering only fire incidents, Stations 8, 9, 21, and 32 were selected most often.

When considering all incidents, fire incidents, and incidents where a Battalion Chief was required and responded, Stations 9, 21, and 32 always appeared in the top 4 station selections.

Because IMOs will be most helpful on all incident types where a Battalion Chief is required, we recommended that Stations 9, 21, 29 and 32 should be considered for IMO placement.

Battalion	Station	Percentage that Station was Selected for IMO Placement in Each Scenario			
		All Incidents	Structure Fires (NFIRS 111-118)	All Incidents with Battalion Chief Required	Structure Fires (NFIRS 111-118) with Battalion Chief Required
401	25	0%	30%	6%	13%
402	29	90%	30%	75%	6%
403	21	100%	90%	100%	100%
404	8	20%	60%	25%	81%
405	37	20%	20%	6%	0%
406	9	80%	80%	94%	100%
407	32	90%	90%	94%	100%

Blue cells denote the four stations with the highest percentage in each scenario.



Conclusion

The map to the left shows 10 minute travel time coverage to the 4 recommended stations for optimal IMO placement.

These 4 stations - 9, 21, 29, and 32 - allow for best use of FRD positions and funds because they:

1. Prioritize coverage to incidents where a Battalion Chief is required;
2. Prioritize incidents with higher response times; and
3. Consider locations of EMS Captains as existing IMO coverage.

Limitations:
This analysis makes the assumption that the Battalion Chiefs are already in an optimal placement.
This analysis does not assess any other variable for IMO placement aside from travel time along the road network in Fairfax County.
Considerations such as the size of a station should be weighed alongside the geographic analysis.

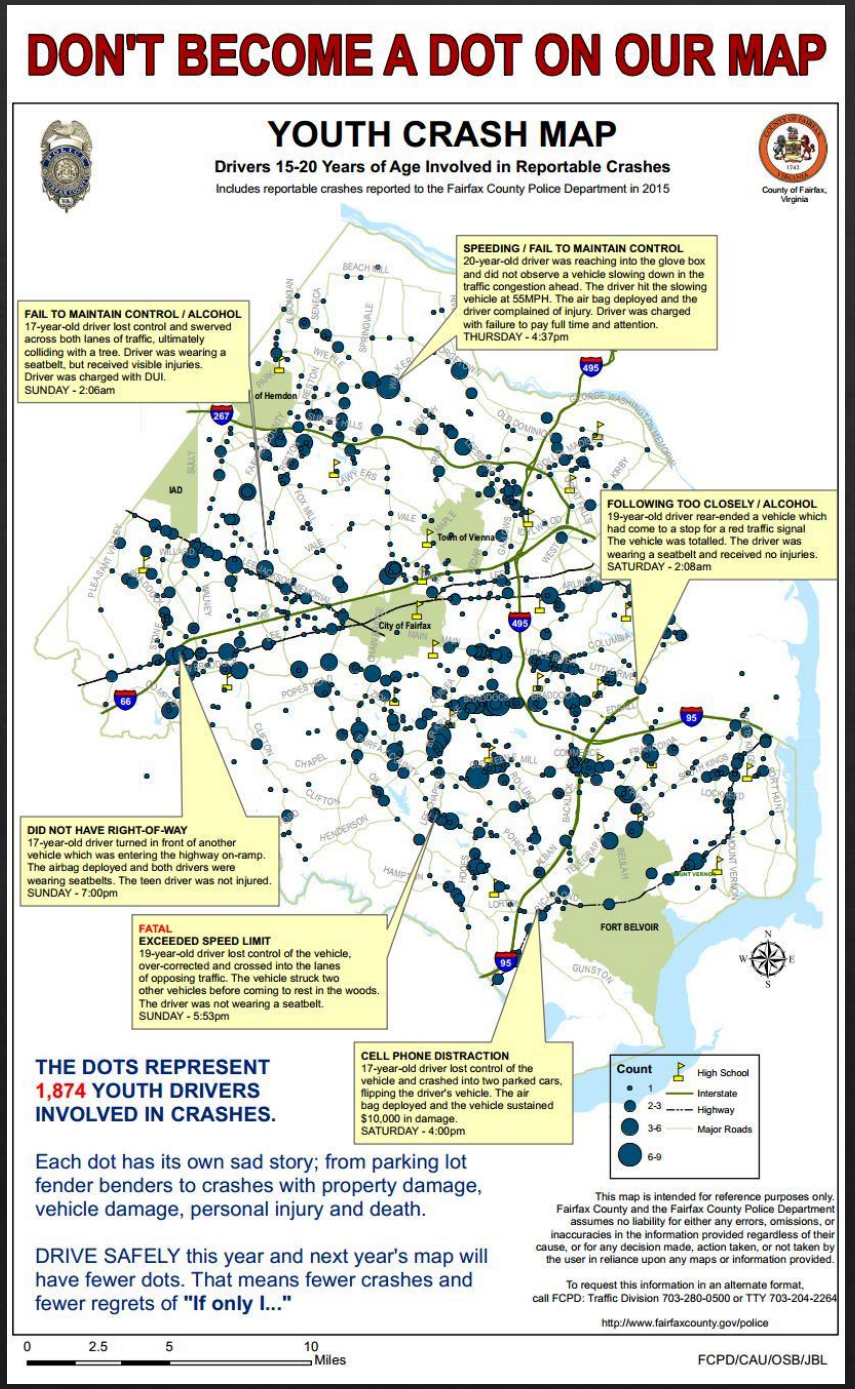
Author: Shelby Zelonis, Fairfax County Fire & Rescue Department. Special thanks to Maura Power for assistance on the project. Questions? Email Shelby.Zelonis@fairfaxcounty.gov

AGENCY CATEGORY

Best Use of GIS for Public Outreach

Youth Crash Map

Police Department



Youth Crash Map

AGENCY CATEGORY
Best Use of GIS on the Web

The Human Services Resource Guide (HSRG)
Neighborhood and Community Services

HUMAN SERVICES RESOURCE GUIDE
USE OF ARCGIS TO ACCESS HUMAN SERVICES IN FAIRFAX COUNTY

The **Human Services Resource Guide (HSRG)** is an online database that contains information about human services available in Fairfax County. It contains 2,000 services provided by 400 nonprofit and government agencies.

Geographic mapping enhancements provide a level of self-sufficiency for service recipients and aid county agencies, service providers, community partners, and residents of Fairfax County in easily locating community resources and navigating the human services system.

This tool allows Coordinated Services Planning staff in the Department of Neighborhood and Community Services to provide referrals to services to assist county residents with emergency needs and access to other important services including:

- Food
- Shelter
- Financial assistance
- Children's services
- Clothing
- Language (ESL/ESOL) classes
- Primary and behavioral healthcare

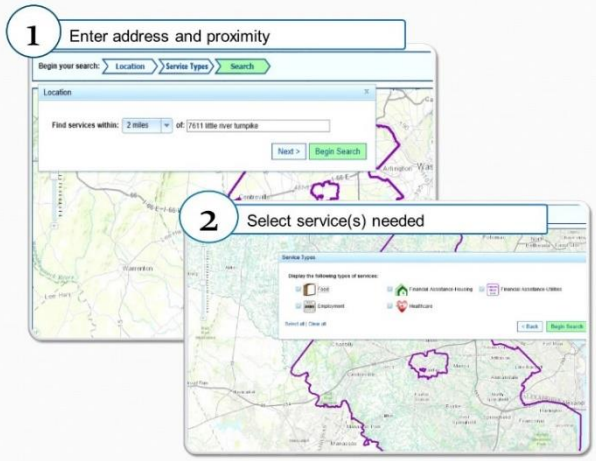
Additional services are also available for specific populations such as older adults, veterans, domestic violence survivors and the homeless.

Each service record includes a map and directions link to the service provider's location.

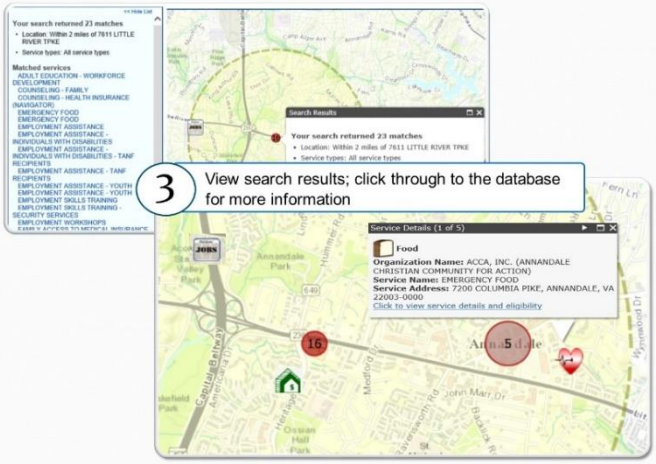
The mapping feature uses ESRI online geocoding and mapping services, base maps and ArcGIS API to locate and display HSRG service locations with contact information.

The HSRG is accessible on the county's public website to anyone in need of services.

Access resources within ½, 1, or 5 mile radius of a single address. Ability to choose from five basic needs categories allows for easy filtering.



User can view a list of resources, a summary of service information and click through to view full service details and eligibility.



WWW.FAIRFAXCOUNTY.GOV/HSRG

Human Services Resource Guide

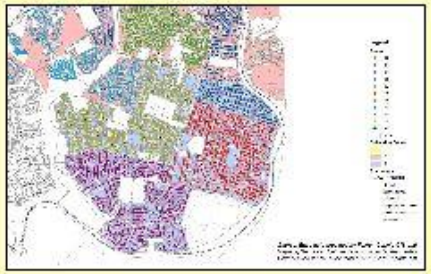
AGENCY CATEGORY
Most Significant Data Contributor

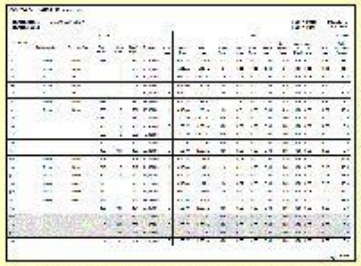
Refuse Collection Truck Re-routing
Solid Waste Management Division of the Department of Public Works and Environmental Services

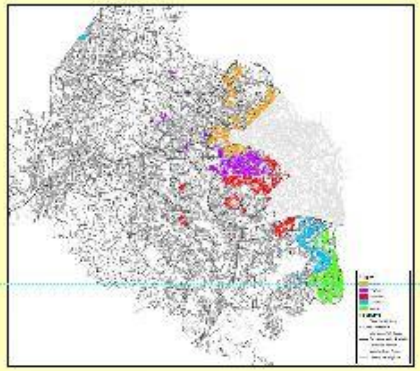
Fairfax County Solid Waste Management Program Fleet Re-routing Project 2015-16

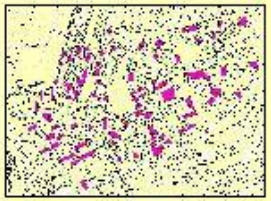
Before

After









AGENCY CATEGORY

Best GIS Integration or Application Development

Quality Review of Land Valuation Adjustments

Department of Tax Administration

Quality Review of Land Valuation Adjustments
Department of Tax Administration, Real Estate Division

Yorka Crespo RES

GIS Day Submission 2016 – Categories: GIS Integration and Application Development, Most Significant Progress

Abstract

- Through the use of Computer Assisted Land Pricing (CALP) models appraisers can ensure the uniform assessment of land on a neighborhood by neighborhood basis. There are however, times when the value determined by CALP must be adjusted to account for land characteristics that affect the value of the parcel. Through an analysis of comparable sales and site characteristics appraisers can make positive or negative adjustments for specific attributes such as lot size, view, proximity to water, golf course, power lines or heavy traffic. These adjustments are called "spot locations".
- Spot locations are reviewed during the annual re-assessment along with many other neighborhood characteristics via the Computer Assisted Assessment download, an excel workbook. Appraisers review spreadsheets along with maps and aerial imagery and conduct field inspections to perform their quality review. Until now this data was not available to appraisers in a single platform.

Background

CONNECTAssessment

EAGLEVIEW PICTOMETRY

CONNECTAssessment and Real Estate Analysis

- DTA procured the web based CONNECTAssessment application to ensure data accuracy by identifying changes to properties through the use of aerial imagery. The application comes with preloaded data layers but it also allows us to upload both Real Estate data and GIS shape files. In effect, we can repurpose this tool for our own analytical needs by loading existing shape files and creating our own files to load. Files are created by querying our database for pertinent data, such as tax neighborhood, neighborhood sales, dwelling characteristics, spot locations etc. and joining this data to a parcel shape file. The resulting shape file is then loaded into CONNECTAssessment.

Pilot Project

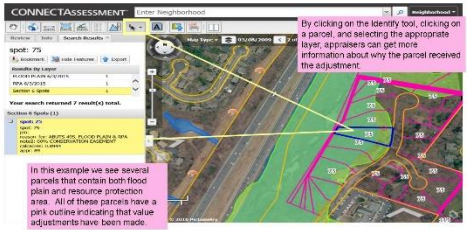
- We tested the application on a small portion of the county, to determine the ease of use and functionality of CONNECTAssessment for land valuation review. Besides the spot location values, several layers were added to the CONNECTAssessment platform such as; utility points and lines, gas lines, flood plain, RPA and easements. Judi Blaine-Stewart, the Residential Supervisor for this portion of the county and her appraisal staff met as a team to review the data together on one large screen in our training room. Looking for anomalies in the data, the team was able to focus in on specific areas, turning layers of interest on and off and viewing changes to neighborhoods by selecting different image libraries along with the spot location data. Once they determined what areas needed a more detailed review, they went out to the field, loaded the CONNECTAssessment application onto their own smart phones and drove through the neighborhood to visually confirm whether the land value adjustments were justified and accurate.

Methods

- Several layers of data were added to the CONNECTAssessment platform.
  - Real estate data was queried through the use of Discoverer. The query included the following information: value of the spot adjustment, reason the spot was applied, size of the parcel and the assigned appraiser. This data was joined to a parcel shape file in ArcMap, saved as a layer file and uploaded into CONNECTAssement.
  - Existing GIS data such as Tax Neighborhoods, Flood Plain, Utility Points, Utility lines, Easements etc. were also loaded onto CONNECTAssessment.
  - Symbology was selected for each layer.
  - Query and display fields were selected so the appraisers could search for properties based on the map number or the tax neighborhood and query for information by selecting the parcel and clicking on a layer.

- Led by the section supervisor, the appraisal team reviewed the data together, discussing the characteristics of the neighborhoods, looking for anomalies and identifying areas that needed further review.

Results



Results

Appraisers loaded the CONNECTAssesment application onto their own smart phones. Then, when they determined which neighborhoods needed a more thorough review they were able to take this data with them to the field reviewing the spot locations and other layers of data on their phones.

Conclusions

- By adding this data to a tool we already had, we added value to that tool and provided appraisers with a faster, easier way of completing their analysis without any added cost to the department.
- Appraisers found the tool easy to use, which means it can be easily integrated into their business process. After using the tool one appraiser commented:

"[This] mapping was a huge success. Thank you so much for making that happen. It made for such an easy day yesterday. We were able to follow the neighborhood maps, see the spots to ensure we have them correctly and uniformly, found others that were either missed or need spots, and covered a lot of neighborhoods with great ease.

I can't thank you enough. What a great report/program."

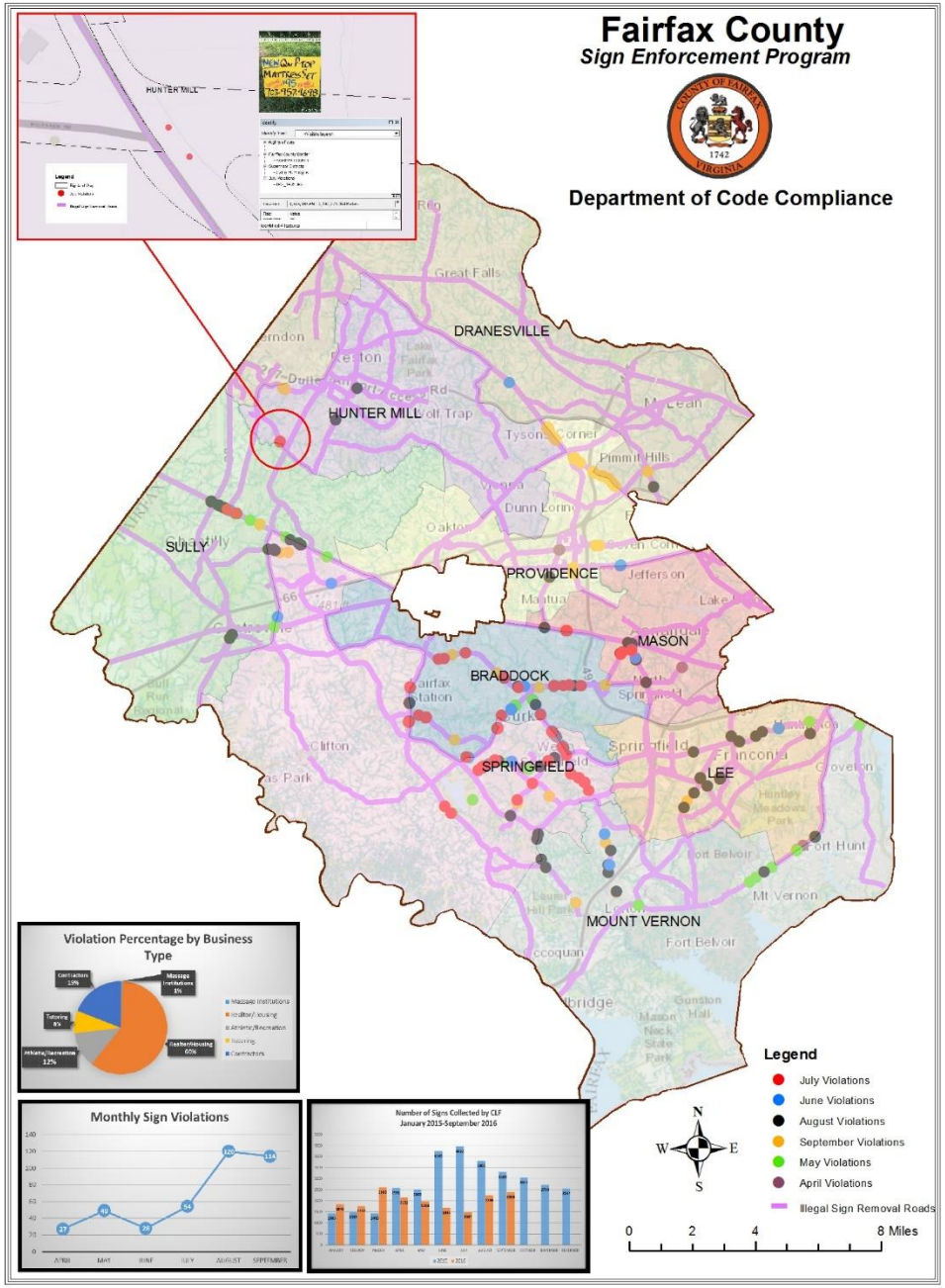
Nancy Bosnak

Senior Real Estate Appraiser

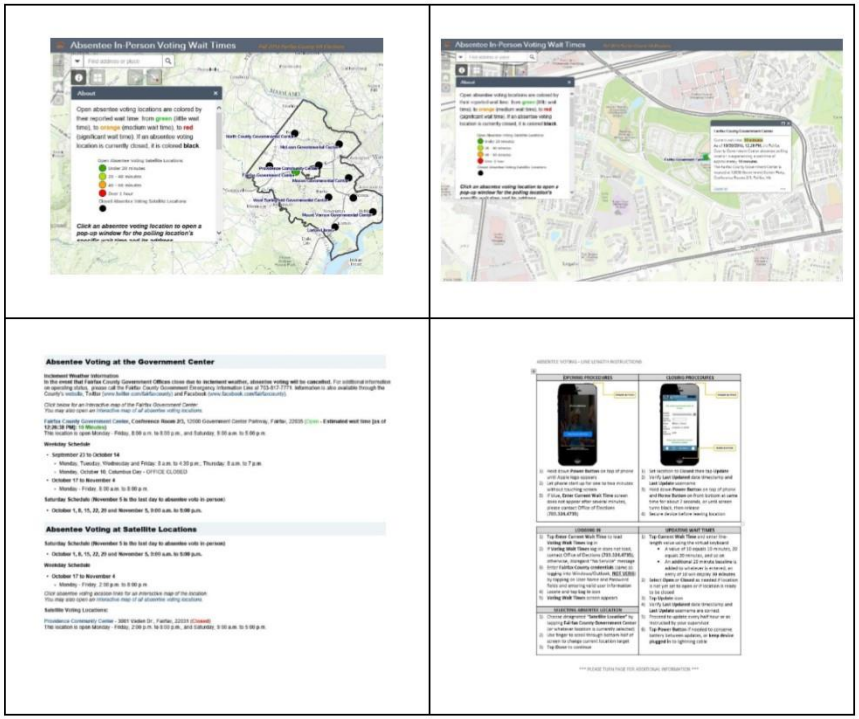
AGENCY CATEGORY
Most Significant Progress

Sign Enforcement Program

Department of Code Compliance

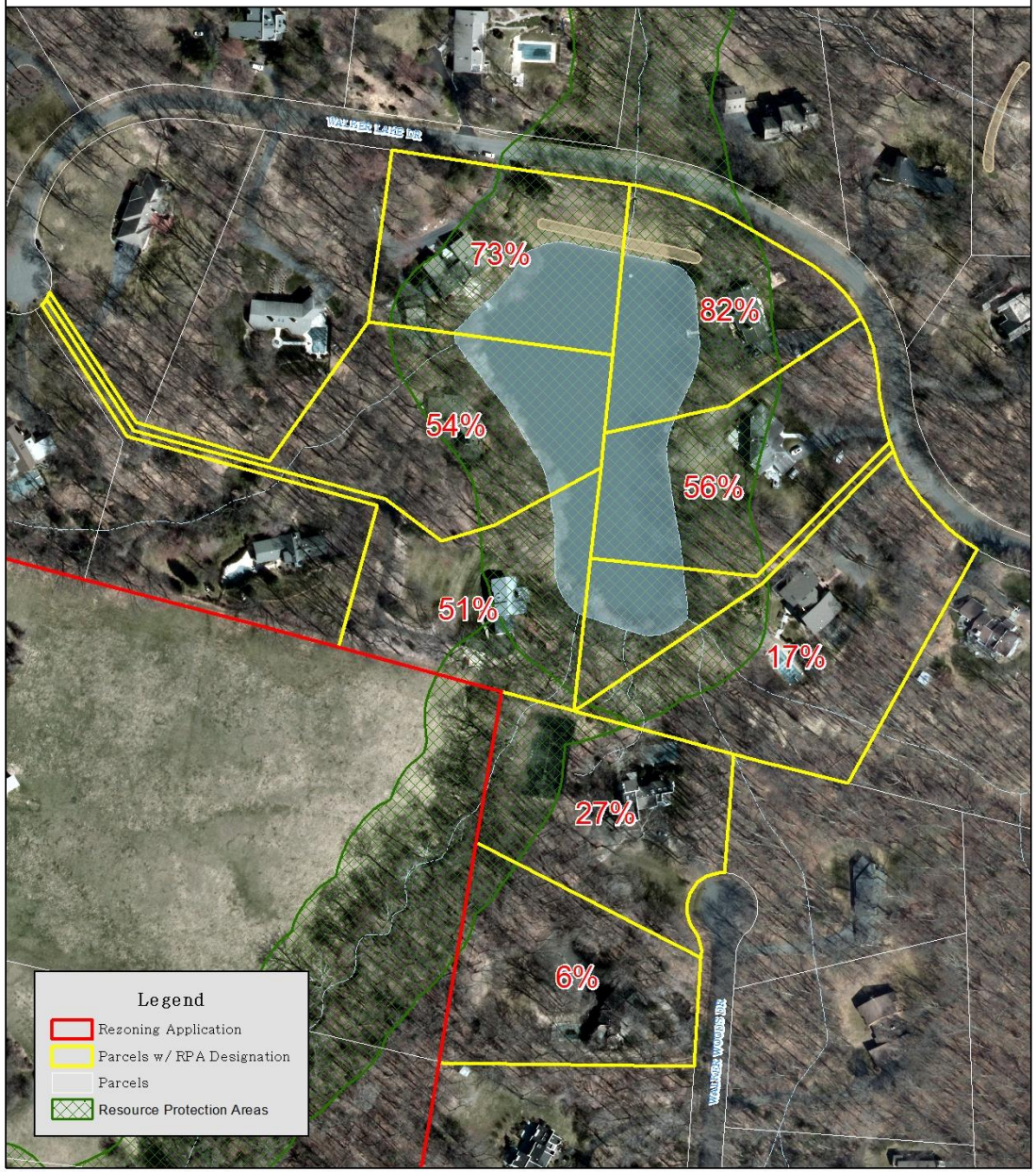


This project utilized the web for a GIS-Office of Elections partnership in which GIS provided the means for a public mapping system through ESRI to help voters identify wait times at absentee voting locations. The integrated absentee locations were identified by a color scheme to clearly indicate location availability, and the interface allowed the public to get directions to these locations and additional information with a click or a tap, depending on the user's access to the page.



GIS also provided the code and instrumentation needed for the Office of Elections (OE) to manage the positioning of map content and wait times as directed from the OE's absentee web page and by remote. OE supplied county-surplus devices to carry out the entry of wait times and OPA helped direct voters to the content from social media sites such as Twitter. From OPA's efforts on social media to GIS's efforts to provide clarity and communication to the public, this project illustrates the best use of intra-agency collaboration and GIS on the web.

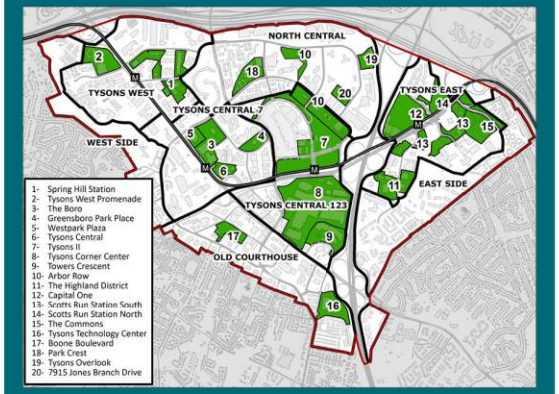
Brooks Farm
RZ 2014-DR-022
RPA Coverage on Adjacent Properties



Tysons Development Tracking Tool

Tysons-Wide Data

	Existing Development[1]	Under Construction	Approved by Site Plan[2]	Approved, Unbuilt Development[3]	Total
Office[4]	7,482,930	940,550	397,480	14,027,892	22,848,852
Retail[5]	4,150,638	30,150	119,366	1,040,054	5,340,208
Hotel	1,050,545	0	0	2,004,655	3,055,200
Total Non-Residential	12,684,113	970,700	516,846	17,072,601	31,253,828
Residential	3,482,074	782,041	1,564,480	18,825,250	25,047,346
Residential Units	3,127	714	1,576	17,698	23,515
Total Development	16,170,588	1,752,741	2,081,326	26,102,115	46,506,685

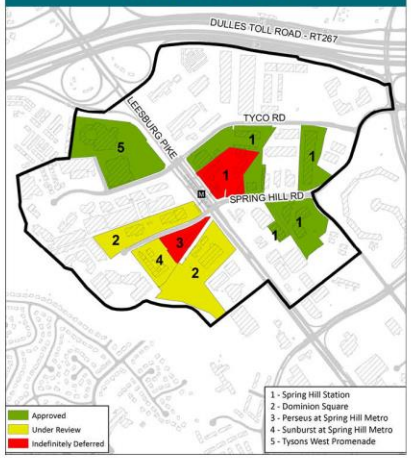


In 2010, the Board of Supervisors adopted the Comprehensive Plan for the Tysons Corner Urban Center. The Plan for Tysons is an essential element in the County's strategic efforts to effectively and efficiently manage future growth.

Staff from the Office of Community Revitalization, County Executive's Office, and the GIS Office collaborated to create and populate a centralized GIS database for monitoring progress on the implementation of the Comprehensive Plan for Tysons.

This robust GIS data model, and its on-going maintenance as the built and entitled environment evolves, contributes significant spatial data to the long-term monitoring and analysis of development in Tysons by a wide variety of County agencies.

District-Level Data



Detailed Development Information

	Option	Office	Retail	Residential GFA	Residential DUs	Hotel	Totals
Existing to Remain							
Building E	N/A	0	7,000	509,800	461	0	516,800
Under Construction							
	N/A	0	0	0	0	0	0
Approved by Site Plan, Not Under Construction							
Building F	N/A	198,740	1,260	0	0	0	200,000
Approved by FDP[1]							
Building A1	N/A	0	0	279,405	267	0	279,405
Building A2	N/A	0	8,000	457,395	427	0	465,395
Building D	N/A	0	6,028	196,766	140	0	202,794
Building E	N/A	0	7,000	509,800	480	0	516,800
Building F	N/A	197,844	2,156	0	0	0	200,000
Approved by CDP[1]							
Building A1	N/A	0	0	279,405	267	0	279,405
Building A2	N/A	0	8,000	457,395	427	0	465,395
Building B	N/A	384,285	8,500	0	0	0	392,785
Building C1	N/A	263,150	12,500	0	0	0	275,650
Building C2	N/A	263,150	12,500	0	0	0	275,650
Building D	N/A	0	6,028	196,766	140	0	202,794
Building E	N/A	0	7,000	509,800	480	0	516,800
Building F	N/A	197,844	2,156	0	0	0	200,000

Department of Planning and Zoning
2016 Fairfax County GIS Day Awards Submission
"Best Use of GIS for Public Outreach"

FAIRFAX COUNTY E·X·C·E·P·T·I·O·N·A·L DESIGN AWARDS 2016

Since 1985, the **Fairfax County Exceptional Design Awards** have recognized achievement in the total design of a building and its site. The awards also aim to raise awareness of outstanding planning and design projects among design professionals and the general public.

In 2016 an ESRI GIS Story Map was developed which incorporated a map tour with narrative text, images and multimedia content to create a powerful presentation of the winners. In conjunction with the Exceptional Design Awards Website the Story Map provides an in-depth presentation of the winning projects serving to promote the program which this year was recognized for excellence with an award from the American Institute of Architects Northern Virginia Chapter.

Exceptional Design Awards

Department of Planning and Zoning
2016 Fairfax County GIS Day Awards Submission
"Best Use of GIS on the Web by an Agency"

Historic Preservation
Historic Fairfax County, Virginia

The Fairfax County Department of Planning and Zoning's Historic Preservation and Heritage Resources site, http://www.fairfaxcounty.gov/dpz/historic/ serves as the County's History web portal. The site tells the story of the County's rich history and its commitment to public stewardship of heritage resources. It incorporates the use of maps with narrative text, images, and multimedia content to create a powerful presentation which is visually engaging and informative. A variety of GIS tools are used within the site to achieve these goals.

Interactive story maps are used to allow users to tour sites that commemorate people, places, or events of regional, statewide or national significance that occurred in the County including historic places and landmarks and, local and state historical highway markers.

GIS was used to develop maps to depict each of the thirteen Historic Overlay Districts in the County which identifies unique areas, sites, and buildings that are of special architectural, historic, or archaeological value to local residents and visitors.

The use and incorporation of advanced GIS techniques to produce materials on the web to preserve and promote historic preservation and heritage resources. This assists in promoting Fairfax County as a travel destination increasing the economic impact of heritage and cultural tourism locally.

NG9-1-1 SPATIAL INTERFACE (SI) PROJECT

PSAP Boundary

- Source of NG9-1-1 Call Routing
- Driven by PSAP Business Requirements
  - GIS Support

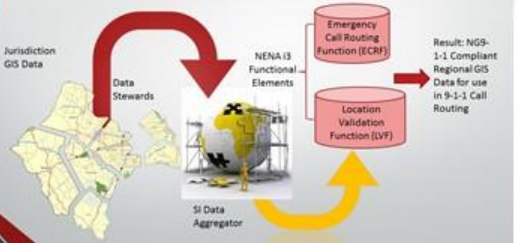
Fairfax County 9-1-1 and GIS working together to make Next Generation 9-1-1 a Reality

PSAP Boundary Coordination

- Determine Data Source
  - Define Preliminary Boundary

  - Refine Throughout Data Synchronization Process
    - What does this mean?
    - Coordination/Agreement with Neighbors
  - Maintenance

NG9-1-1 Spatial Interface (SI) Project



NG9-1-1 Spatial Interface Project (GIS)

- Developing GIS and ALI/MSAG data management workflows for each jurisdiction to efficiently keep 9-1-1 location data accurate
- Developing NoVA PSAP boundary layer; MD/DC/MWAA boundary layers to allow 9-1-1 calls to be routed to the right 9-1-1 center using geo-code locations
- Next steps:
  - Continued quality control of coalesced regional dataset over next 18-24 months
  - QA/QC Plan for each jurisdiction
  - Load and test the pilot ECRF/LVF using the coalesced Regional dataset

2016-2018

- Ensure GIS data accuracy meets established NG9-1-1 standard and fits within a common GIS data model
- Begin to phase out legacy network (2016)

Fairfax County DPSC staff and GIS staff from the Department of Information Technology (DIT) comprise a team developing a strategic implementation of GIS data to support a significant technology transformation in support of 9-1-1 emergency call processing. The combined Fairfax County team is leading a regional effort with other Northern Virginia Public Safety Answering Points (PSAPs) to implement a NG9-1-1 Spatial Interface. This project will make jurisdiction GIS data available in a format that will support the routing of 9-1-1 calls to the County's 9-1-1 Center through a future regionally based Next Generation 9-1-1 network. The GIS data solution developed by the Fairfax County team fulfills the National Emergency Number Association (NENA) i3 Spatial Interface (SI) standards for the NG9-1-1 Emergency Services IP network (ESInet) which is currently out for bid under a competitive procurement with an expected implementation sometime in 2018.

The proof of concept the team is working collaboratively on involves developing revised GIS data maintenance workflows for NG9-1-1 data and also the preparation of a regional GIS dataset by aggregating locally authoritative GIS datasets from Stafford County, Arlington County, the City of Alexandria, Fairfax County, Loudon County, and Prince William County. The dataset being developed will be suitable for provisioning into a live NG9-1-1 Emergency Call Routing Function (ECRF) and Location Verification Function (LVF) system in the future. A regional ECRF and LVF does not exist currently, so this proof of concept effort is a preliminary preparatory step toward a live capability.

The existing Verizon Network for the legacy 9-1-1 system is nearing obsolescence and data preparation is a key element of transitioning to NG9-1-1. The Fairfax County Team has begun to transform GIS county data into datasets that will allow the transition from the current tabular MSAG and ALI database to the GIS data formats that are needed to populate the ECRF and LVF of the NENA i3 architecture. The project team has made significant progress in getting data into the proper formats by coalescing the various GIS datasets into a combined regional GIS dataset containing the following layers: Road Centerlines, Site/Structure Points, Emergency Services Boundaries (PSAPs, law, fire), and Administrative boundaries (city, state, etc.). The team has made significant contributions in leading other jurisdictions in addressing strategic GIS data considerations that will ensure the success of the future NG9-1-1 ECRF/LVF system residing on the regional ESInet.

NG9-1-1 Spatial Interface Project (GIS) Project Status

Fairfax County Department of Public Works and Environmental Services
Stormwater Planning Division
Utilizing Story Maps to Inform the Public of Proposed Projects

Background

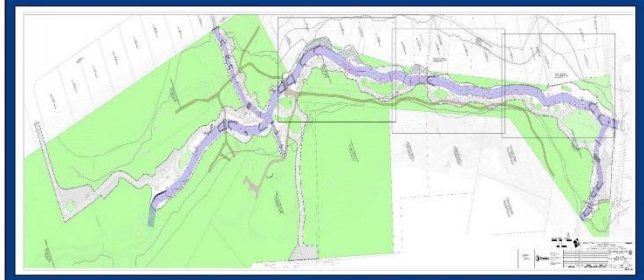
Fairfax County Stormwater Planning Division has many ongoing projects in the county which can directly affect the surrounding private properties. The Dead Run Stream Restoration Project at McLean Central Park is an excellent example. The majority of the project is on land owned by the Fairfax County Park Authority, but the remaining sections of the project were on private properties. The project scope includes the removal of 150 at risk trees along the stream bank which of course can be alarming to the residents affected by the project. To ease concerns Stormwater Planning worked with the Mclean Citizen Association, Mclean Tree Foundation and concerned residents to perform stream walks using printed maps and concept plans for reference in the field. This effort identified and documented problem areas with photos which were to be later presented to the public. This process can be tedious and ineffective in communicating complex project details to the public in an efficient manner. Therefore, a better way to combine these processes in a digital format made easily available to the public was needed.

Solution

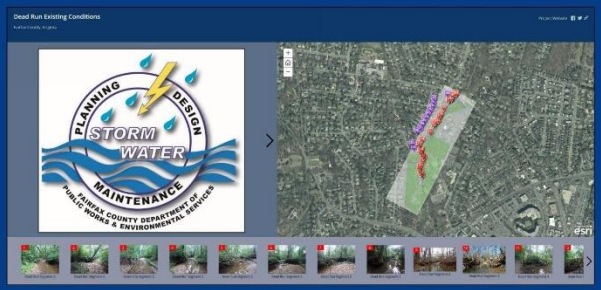
A Story Map was the perfect venue for displaying this type of data to the public in a user friendly visual format that clearly identifies the scope and extent of the project. Developing a Story Map for the project required gathering data that included photos, plans and the narrative descriptions of the photos that make up the story. ArcMap was then used to georeference the concept plans and create a tile package that was published to ArcGIS Online. The geotagged photos and their descriptions were then added to the Story Map. Artistic renderings were created showing several sections of the proposed work and used in a second Story Map to display the before and after of the projects.

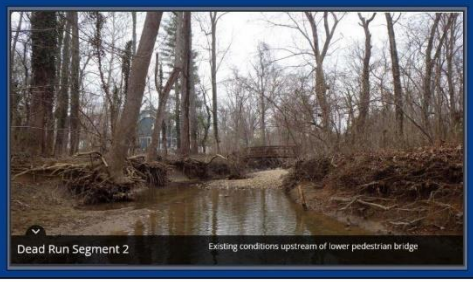
The proposed project Story Map was presented at public citizen meetings and then made available on county's Stormwater Projects web page. We plan to continue using Story Maps for future projects to showcase the entire project lifecycle from project scoping to construction completion. They have proved to be a valuable resource for increasing transparency and providing detailed project information to the public. Furthermore, the Story Map not only gives the public a better overall perspective of the project scope in relation to their property, but also creates a virtual stream walk for citizens without even getting their feet wet.

From Paper Plans, Maps and Photos



To a Sleek, User Friendly, and Informative Story Map





Stormwater Planning Division

Fairfax County Public Works and Environmental Services

Dead Run Existing Conditions

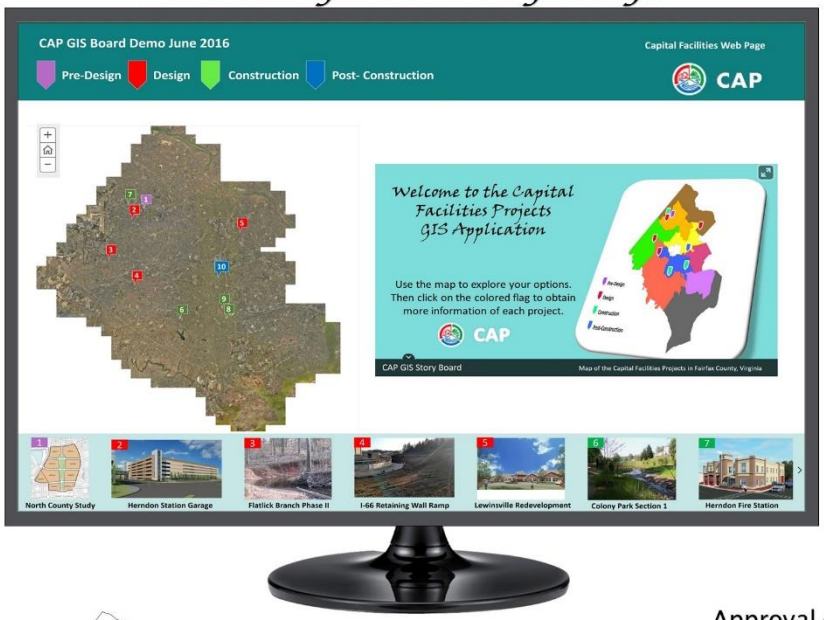
Proposed Dead Run Stream Restoration Renderings

Land Survey Branch Presents:

Capital Facilities GIS Story Board Initiative

Existing PDF's -Basic Reporting

CAP Projects Story Map



GOAL

Provide attractive, easy to use, visual and spatial information about our projects.

- Open information
- Easy access
- Interactive map
- Visual appeal
- Maps for "Completed Projects" book

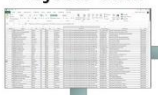
DPWES Initiative:
Automated Capital Project Status on Public Website

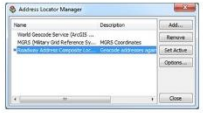
CAP IT Strategic Plan

CAP IT Initiative II-1:
Provide GIS public web solution that integrates Project Management Systems (CPMS) and GIS databases to access high profile capital project reporting and project signage.

The Integration Process

Projects data





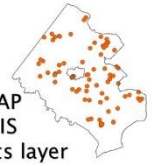
Geodatabase

CAP Projects

Integrated data

&

CAP Projects



CAP GIS Projects layer

Project Roadmap

CAP IT Strategic Plan — April 2015

SDE layer — September 2015

Work Group — April 2016

May 2016

ArcGIS Online

Approval & Implementation — Pending

County of Fairfax, Virginia
Department of Public Works and Environmental Services Capital Facilities, Utilities Design and Construction Division
-Land Survey Branch-

Capital Facilities Story Map

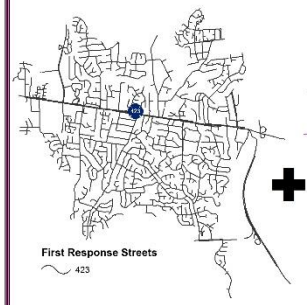
3 Deep Response Maps for Fire Engines

The Fire and Rescue Department recently started producing maps showing the 2nd and 3rd due engine response areas. A response area is the area a unit is likely to be dispatched to on an emergency incident.

These maps are a combination of the first, second, and third response areas as determined from the run order list. The run order is the expected order an emergency unit is likely to be dispatched for a given area. These maps assist with planning for duties during fire incidents. The order an engine arrives on site determines the tasks they will perform.

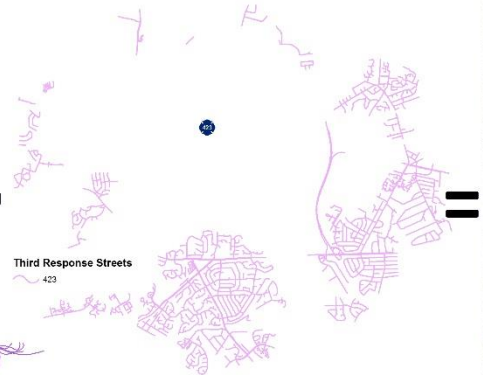
The first set of maps below shows the expected response areas from Fairfax County Fire Station 423 as first, second, or third arriving engine for a single family house fire. Using Network Analyst from Esri and Box-area Automated Runcard Builder (BARB) software by Deccan International, complete run orders are derived for each street and over 150 fire stations. Attribute data from BARB in MapInfo format is converted into a shapefile then parsed into separate response areas, i.e., 1st, 2nd, 3rd, etc.

Expected 1st Engine Response from Fire Station 423

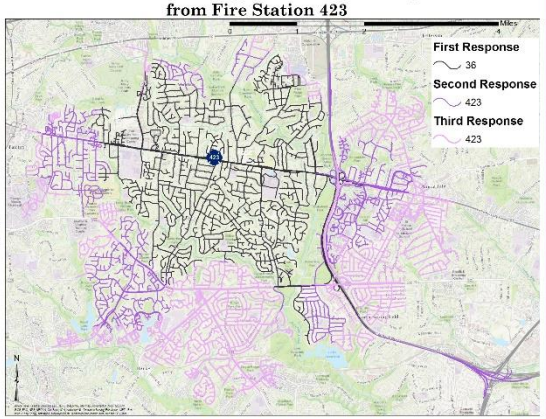


Expected 2nd Engine Response from Fire Station 423

Expected 3rd Engine Response from Fire Station 423



Combined First through Third Engine Response from Fire Station 423



Duties During a Single Family House Fire

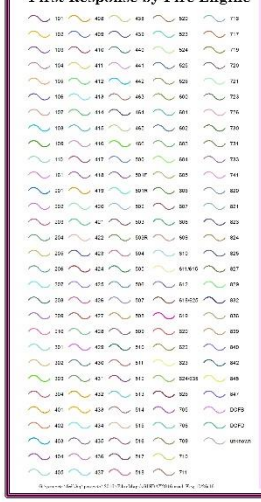
Side A, Supply lines, Initial attack line, command decision, complete RECON lap, visualize Side C and announce findings.

Water supply for 1st Engine, backup line/ line above.

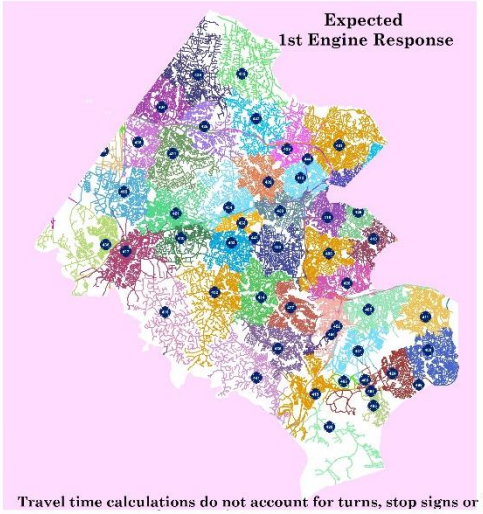
Position for second water supply, check Side C. check for extension, exposure line.

The maps below show Fairfax County's overall first response, second response, and third response for engines. Close to each fire station is the first or initial response. The same street color can be followed in the successive maps as the position of the engine changes in the dispatch order.

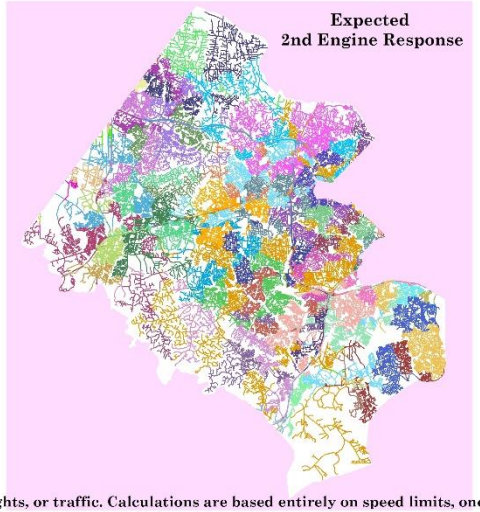
First Response by Fire Engine



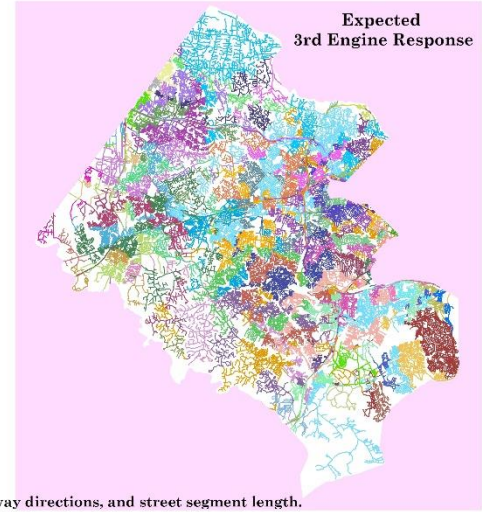
Expected 1st Engine Response



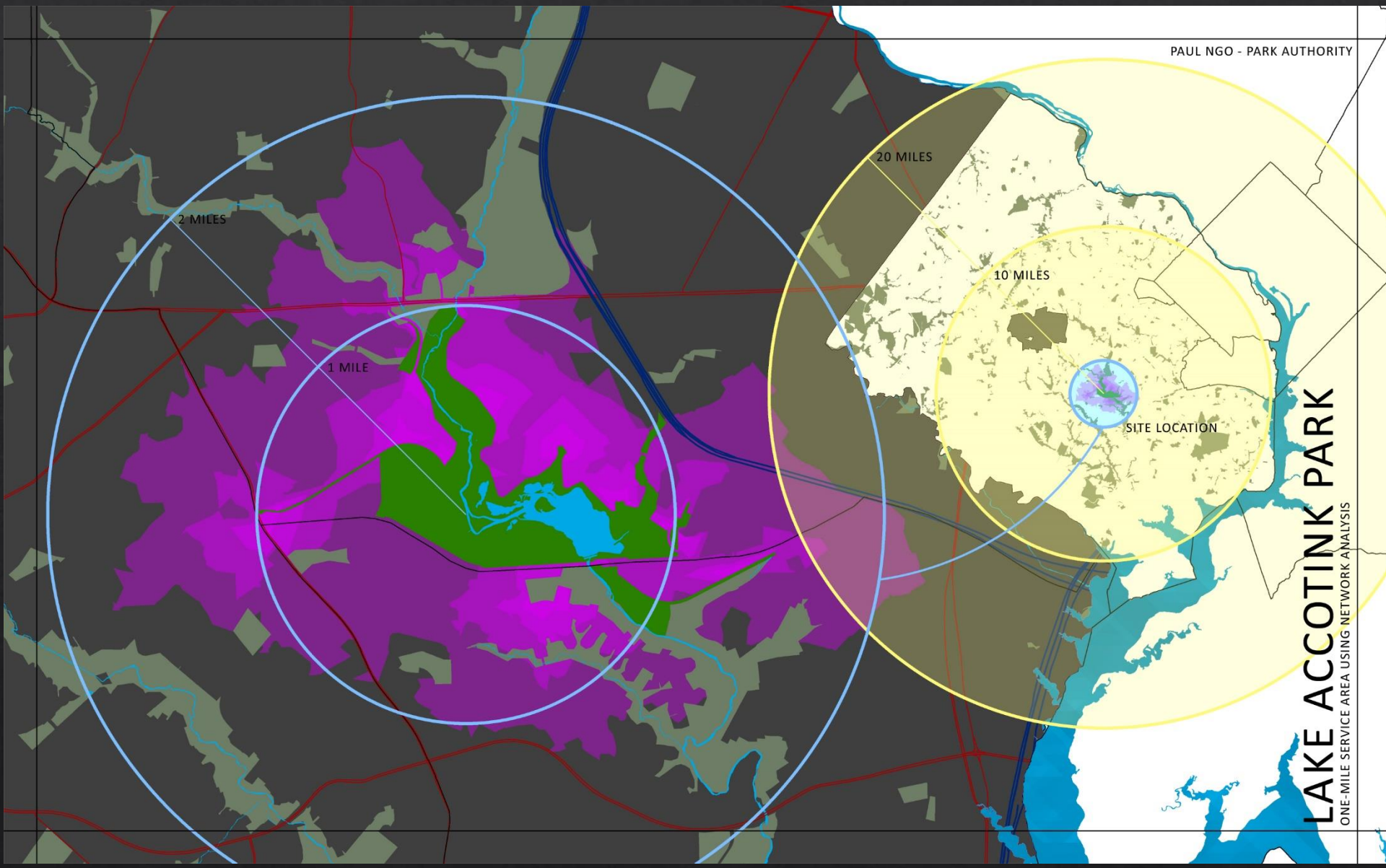
Expected 2nd Engine Response



Expected 3rd Engine Response



Travel time calculations do not account for turns, stop signs or lights, or traffic. Calculations are based entirely on speed limits, one way directions, and street segment length.


PAUL NGO - PARK AUTHORITY
20 MILES
10 MILES
2 MILES
1 MILE
SITE LOCATION
LAKE ACCOTINK PARK
ONE-MILE SERVICE AREA USING NETWORK ANALYSIS

Are Fairfax County Students Getting More Sleep?

THE DECISION

Fairfax County Public Schools (FCPS) implemented a $4.9M plan for later high school start times at the beginning of School Year (SY) 2015-16. The impact of this change went beyond high school students and their families and affected middle school students who had to start the school day earlier than before.

THE QUESTIONS

- Are more high school students sleeping eight or more hours on school nights as a result of the investment in later start times?
- What is the impact of the change on the sleep patterns of middle school students?

THE DATA

Data from the Fairfax County Youth Survey from SY2014-15 (before the change in start time) was compared to data from SY2015-16 for each school pyramid.

An interactive choropleth map was created using ArcGIS Online showing the percentage point difference between the two school years for 8th, 10th, and 12th grades.

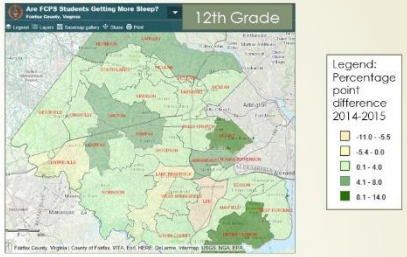
ANALYSIS and IMPACT

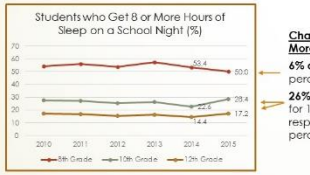
The maps show that most high schools experienced more students in 10th and 12th grades getting eight or more hours of sleep as a result of the later start of their school day.

There was a general decrease in 8th grade middle school students getting eight or more hours of sleep, with the exception of 8th-grade students at FCPS secondary schools that enroll students in 7th through 12th grades (so those 8th graders had later start times) as well as Twain Middle School in the Edison High School pyramid.

The maps allow county and FCPS leadership to spatially visualize the impact the change in school start times have on the prevalence of FCPS students getting eight or more hours of sleep at night. Areas that had the greatest changes as well as anomalies can be quickly and easily identified. The mapping application also provides pyramid-specific information through a pop-up function.

Similar analysis can be done on other data collected from the Youth Survey to determine if programs related to mental wellness, bullying, nutrition and a variety of other services are effective.

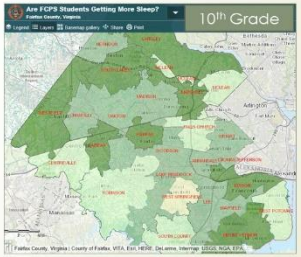


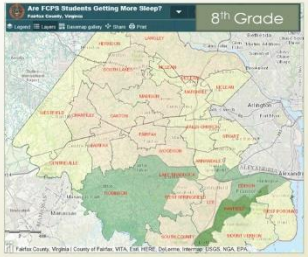


Change in Getting 8 or More Hours of Sleep

6% decrease in percentage of students

26% and **19% increase** for 10th and 12th grade, respectively, in percentage of students





BACKGROUND

Research shows that adolescents benefit from later school start times to get a sufficient amount of sleep. The Fairfax County School Board approved a recommendation for starting high schools later, between 8 and 8:10 a.m., and ending between 2:45 and 2:55 p.m. The new bell schedule was implemented in September 2015 and affected more than 57,000 high school students, representing more than 30 percent of the FCPS student population. County leaders now want to know whether this policy change achieved the desired results.

The Fairfax County Youth Survey, a comprehensive, anonymous and voluntary survey given each year to students in grades 6, 8, 10 and 12, examines behaviors, experiences and other factors that influence the health and well-being of Fairfax County's youth. The results provide a snapshot of the county's youth and serve as a barometer of the community's effectiveness fostering healthy choices in young people. The Youth Survey is a collaboration of Fairfax County Government and the Fairfax County Public Schools.

http://www.fairfaxcounty.gov/youthsurvey

Use of Formcentric GIS Apps for Data Collection

Background

Recently, Esri has released a few new applications for data collection that are unlike traditional "mapcentric" apps.

These new "formcentric" apps allow for data collection (whether in the field or in the office) via a form/survey instead of picking a point a map.

The formcentric apps are much easier for non-GIS users to use, yet still provide GIS analysts with important GIS data on the backend.

The Fire and Rescue Department (FRD) has recently made use of two of these tools: the **GeoForm** and **Survey123**.

Both are available for free with our existing licenses, are easy for field staff to use, eliminate antiquated methods, and have made our business processes more efficient.

Take a look at how Esri's formcentric and mapcentric apps differ and choose the best for your project:

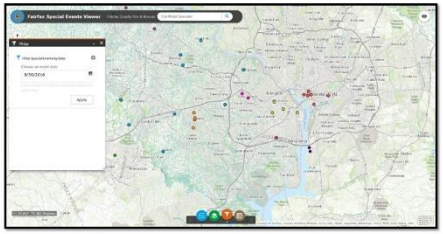
Functionality	Survey123	Collector	GeoForm
Data collection style	Formcentric	Mapcentric	Formcentric
Supports capture of new data	Yes	Yes	Yes
Supports editing existing data	No	Yes	No
Smart forms	Yes (XLSForm)	No	No
Works offline	Yes	Yes	No
Supports anonymous access	No	No	Yes
Platforms	iOS, Android, Windows, Windows Phone, Mac, Linux	iOS, Android, Windows	Web
Technical Support	Esri and the community	Esri and the community	Esri and the community

The Geoform and the Special Events Viewer

The Special Events Viewer is an online map that allows FRD and the Office of Emergency Management (OEM) personnel to view special events occurring in the county and surrounding jurisdictions.

Problem: Originally, data about special events (including the address) were input into an Excel spreadsheet and emailed out to users. Why not map them?

First Solution: Initially, FRD geocoded the addresses in ArcMap, published a feature service, created an online viewer, and updated the feature service weekly. However, this involved manual commitment, we weren't tracking who enters the data (duplicates), addresses could be geocoded incorrectly, and Excel just really isn't a good way to store data.



Scan above to view the GeoForm!

Scan below for the Special Events viewer!

Enter the GeoForm!

The GeoForm is a web mapping application provided by Esri that allows for **formcentric** data entry and direct editing of an existing feature service.

Benefits:

- Easy to set up
- Uses existing feature service for fields, can make use of domains for drop-down lists
- Can make fields required (e.g., data collector must enter his/her name)
- Minimal training required
- Doesn't use ArcGIS Online credits
- No incorrect geocodes because the user picks the map location themselves
- No named user required

Bottom line:
The GeoForm has made entering special event information easier, less time-consuming, and provides more accurate information to our field personnel.

Survey123 and the Palliative Care Pilot

The Palliative Care pilot study developed out of a collaboration between FRD, INOVA Health System, and hospice agencies in the county. The goal is to better serve patients who are enrolled in hospice (end of life care).

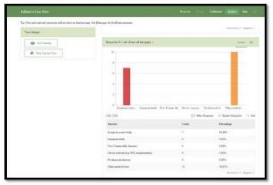
Problem: INOVA would like baseline data about the population of hospice patients that are encountered through EMS. Initially, a paper survey was created to be distributed to EMS Captains to fill out while on-scene at the call, but why not find a digital solution?

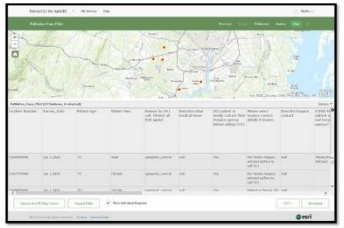
Enter Survey123!

Survey123 is a free app developed by Esri that allows for easy, **formcentric** data collection via responsive surveys.

Benefits:

- A free app for use on PCs, mobile devices, and tablets
- Minimal training required
- Tons of customization options!
- The survey is responsive – it changes based on how questions are answered
- Can collect GPS point in background without user having to select their location
- User can choose to save their survey and finish it later
- Data immediately updated in a feature service when the user hits "submit"
- No anonymous access allowed, so you know who is entering your data
- Many options for analyzing results – charts, exports, and maps available for every question on the survey!





Bottom line:
Survey123 is an excellent tool for collecting hospice patient data. It is easy to use, eliminates paper surveys, and provides excellent data visualization.

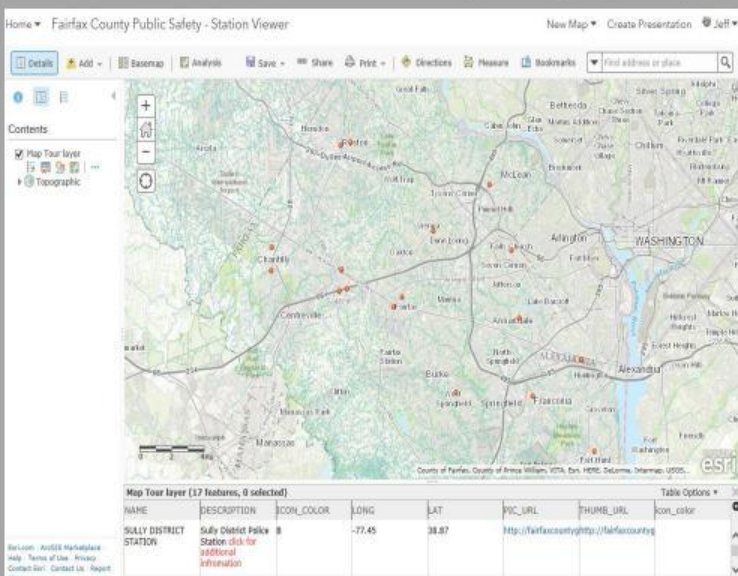
Author: Shelby Zelonis, Fire and Rescue Department. Special thanks to Ian Gregoire and Maura Power for assistance with the projects. Questions? Email Shelby.Zelonis@fairfaxcounty.gov

Fairfax Special Events Viewer

Fairfax County Public Safety – Station Viewer

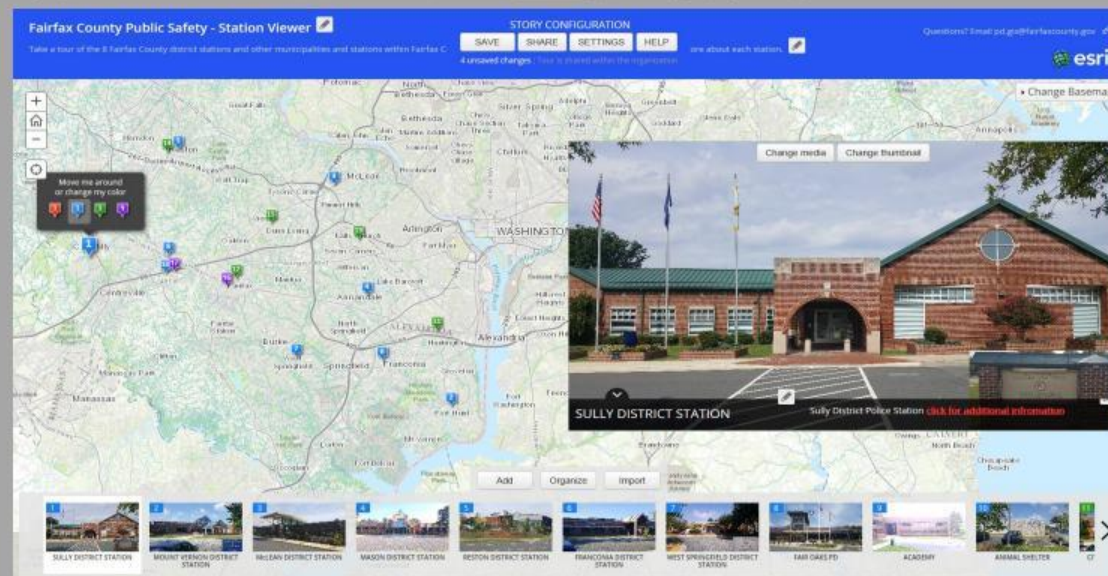
With the use of the CSV template

OBJECTID_1	NAME	DESCRIPTION	ICOI	LONG	LAT	PIC_URL	THUMB_URL
1	SULLY DISTRICT STATION	Sully District Police Station click for additional infromation 	B	-77.45142914120	38.87122844050	http://fairfaxco	http://fairfaxcountygis.maps.arcgis.com/sharing/rest/content/items/b4bc29f9f62047beac3b40261051fffb/data
2	MOUNT VERNON DISTRICT STATION	Mount Vernon Police District Station <a href="http://www.fairfaxcounty.gov/police/stations/mountvernon/" style = "color:#FF3333" target ="_blank"> click for additional infro	B	-77.07680087250	38.74150217080	http://fairfaxco	http://fairfaxcountygis.maps.arcgis.com/sharing/rest/content/items/ddd5b5d28e5948d39b7afcacf2342c00/data
3	McLEAN DISTRICT STATION	McLean District Police Station click for additional infromation 	B	-77.19847384930	38.93261315390	http://fairfaxco	http://fairfaxcountygis.maps.arcgis.com/sharing/rest/content/items/37340415cc824075abd1da8ca1347b0f/data
4	MASON DISTRICT STATION	Mason District Police Station click for additional infromation 	B	-77.16398552130	38.83720228980	http://fairfaxco	http://fairfaxcountygis.maps.arcgis.com/sharing/rest/content/items/3f0b911ff2154d5b9f5e099070ec8d4c/data
5	RESTON DISTRICT STATION	Reston District Police Station click for additional infromation 	B	-77.35991063990	38.96294542070	http://fairfaxco	http://fairfaxcountygis.maps.arcgis.com/sharing/rest/content/items/a3f29ad19dc14d26bd26499a1f2c4125/data
6	FRANCONIA DISTRICT STATION	Franconia District Police Station <a href="http://www.fairfaxcounty.gov/police/stations/franconia/" style = "color:#FF3333" target ="_blank"> click for additional infromation <	B	-77.14787166140	38.78109609010	http://fairfaxco	http://fairfaxcountygis.maps.arcgis.com/sharing/rest/content/items/5267a4920eca47b8b2caad31205b9735/data
7	WEST SPRINGFIELD DISTRICT STATION	West Springfield District Police Station <a href="http://www.fairfaxcounty.gov/police/stations/westspringfield/" style = "color:#FF3333" target ="_blank"> click for additional i	B	-77.22746801080	38.78344157310	http://fairfaxco	http://fairfaxcountygis.maps.arcgis.com/sharing/rest/content/items/b43e8670a34540dbb11af1bada0dfe37/data
8	FAIR OAKS PD	Fair Oaks District Police Station <a href="http://www.fairfaxcounty.gov/police/stations/fairoaks/" style = "color:#FF3333" target ="_blank"> click for additional infromation </a	B	-77.37020026700	38.87164917350	http://fairfaxco	http://fairfaxcountygis.maps.arcgis.com/sharing/rest/content/items/7e7c2e70502b47f6a131a3be976f1ba9/data
9	ACADEMY	Fairfax County Police Academy click for additional infromation 	B	-77.45088289030	38.88811611970	http://fairfaxco	http://fairfaxcountygis.maps.arcgis.com/sharing/rest/content/items/6bc94dcd15694cf9a7acce4f732dfd6e/data
10	ANIMAL SHELTER	Fairfax County Animal Control <a href="http://www.fairfaxcounty.gov/police/animal/animal-control-services.htm" style = "color:#FF3333" target ="_blank"> click for additiona	B	-77.37257748790	38.85627399050	http://fairfaxco	http://fairfaxcountygis.maps.arcgis.com/sharing/rest/content/items/1db9e6d8bcad41ffa934237e84517631/data
11	CITY OF ALEXANDRIA PD	City of Alexandria Police Station click for additional infromation 	G	-77.09166996110	38.80714339870	http://fairfaxco	http://fairfaxcountygis.maps.arcgis.com/sharing/rest/content/items/c9c299f05a2c4365b77e89eb6e53ab50/data
12	FAIRFAX CITY PD	Fairfax City Police Station <a href="http://www.fairfaxva.gov/government/police/chief-s-message" style = "color:#FF3333" target ="_blank"> click for additional infromation <,	G	-77.29964756680	38.85231184390	http://fairfaxco	http://fairfaxcountygis.maps.arcgis.com/sharing/rest/content/items/c9c299f05a2c4365b77e89eb6e53ab50/data
13	CITY OF FALLS CHURCH PD	City of Falls Church Police Station click for additional infromation 	G	-77.17256459380	38.88568481990	http://fairfaxco	http://fairfaxcountygis.maps.arcgis.com/sharing/rest/content/items/e9cbfbc5030d43fbabe99dc627b20761/data
14	TOWN OF HERNDON PD	Town of Herndon Police Station click for additional infromation 	G	-77.37152476610	38.96133643280	http://fairfaxco	http://fairfaxcountygis.maps.arcgis.com/sharing/rest/content/items/8492bc76a45b4866b39e23411ed6daa7/data
15	NEW - PUBLIC SAFETY BUILDING	New - Public Safety Building click for additional infromation 	B	-77.36347843190	38.85776291900	http://fairfaxco	http://fairfaxcountygis.maps.arcgis.com/sharing/rest/content/items/edf431e124076d33a0f9b1447607251d/data
16	PUBLIC SAFETY MASSEY BUILDING	Public Safety Massey Building click for additional infromation 	B	-77.30955042820	38.84508574420	http://fairfaxco	http://fairfaxcountygis.maps.arcgis.com/sharing/rest/content/items/dff0c201cfd04007b8604d479fc239fe/data
17	TOWN OF VIENNA PD	Town of Vienna Police Station click for additional infromation 	G	-77.26552660880	38.89955528850	http://fairfaxco	http://fairfaxcountygis.maps.arcgis.com/sharing/rest/content/items/b9aebde458834cb98c40b4534366fede/data



ESRI Online map of the Public Safety Stations

Data points were updated, verified or collected in the field using ArcCollector on an iPhone. Images of the Police Station's were collected within ArcCollector and displayed with an ArcGIS Online Map.



Story Map of Fairfax County Public Safety – Station Viewer

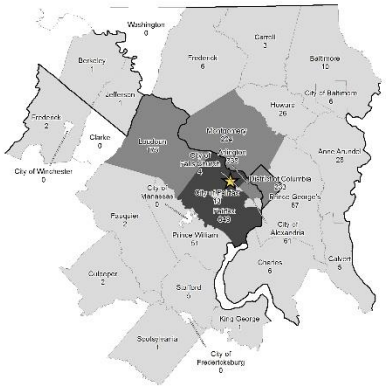
Story Map application that displays the location of FFX public safety buildings, while providing an image and hyperlink to the station webpage. A CSV template was downloaded with Story Map to allow the import of the above CSV file. The template reads the above format and makes the needed connections and displays the points and images within the map.

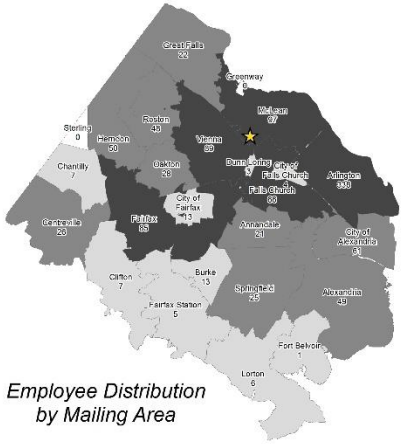
By Jeff Gallagher
Police GIS Analyst

[Fairfax County Public Safety – Station Viewer]

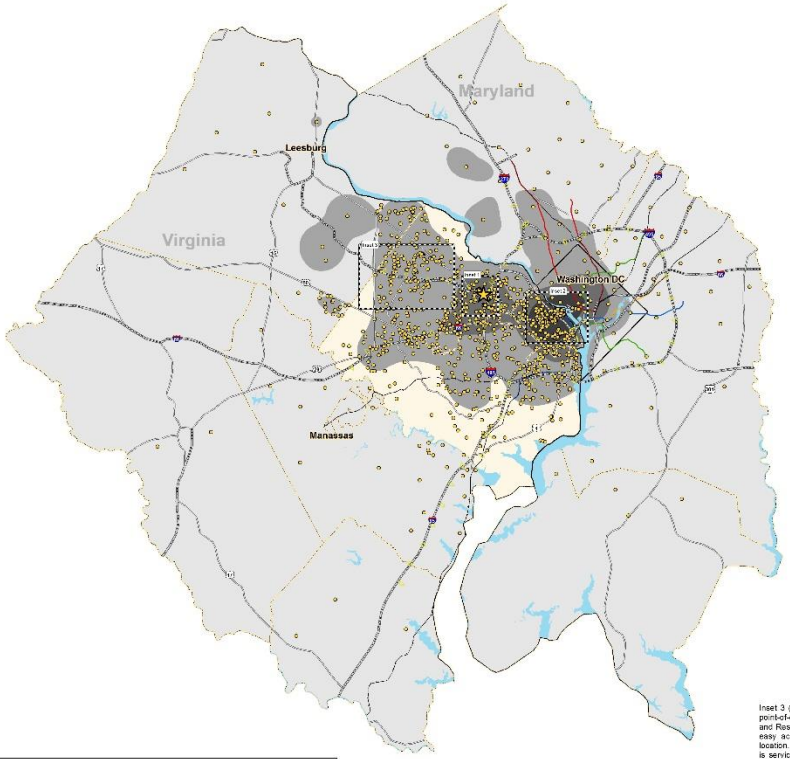
Ernst & Young
Geographic Distribution of Employees

Employee Distribution by City/County





Employee Distribution by Mailing Area



Employee Point of Origin (Above)

The central map illustrates the geographic density of employees of Ernst & Young throughout Fairfax County as well as the counties near Fairfax. Out of 1983 total employees, all were able to be located, 1808 (91.2%) are shown within the extents of this map. Typically one dot represents one employee, but in areas outside Fairfax County and some areas, depending upon the density of employees and the scale of the map or inset, many dots may be stacked at a single location. Employees located outside Fairfax County were located using zip codes and are not as accurate for street level analysis.

- Ernst & Young Office Location
- Ernst & Young Employee
- Fairfax Connector
- Metrobus
- ART Bus
- Interstate
- Major Road
- Railroad
- HOV Lanes
- Blue Line Metro
- Green Line Metro
- Red Line Metro
- Silver Line Metro
- Yellow Line Metro
- Orange Line Metro
- Park and Ride
- State Boundary
- County Boundary
- Water Boundary
- Low Density
- Medium Density
- High Density

Map prepared in September 2016 by the Fairfax County Department of Transportation
Virginia North State Plane Coordinate System, North American Datum 1983, US Survey Foot
Highway data obtained from the National Atlas
Employee address data obtained from Ernst & Young

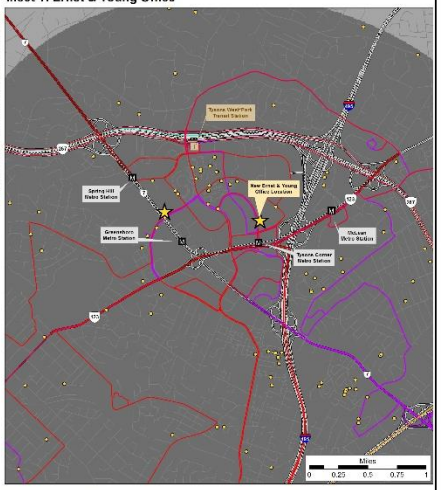
FCDOT Serving Fairfax County Since 1977

N W E S

Miles 0 5 10 15 20

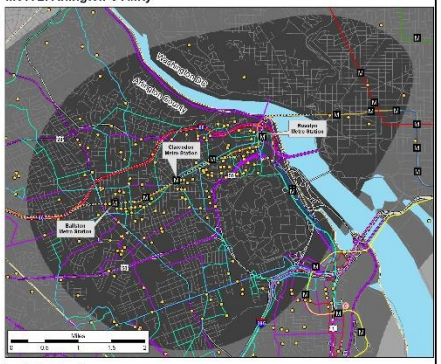
Inset 1: Ernst & Young Office

Inset 1 (Right): This inset displays a mid-density point-of-origin area as well as the vicinity of the Ernst & Young office. Employees living in this area have access to multiple forms of public transportation. The new Ernst & Young office is directly serviced by the Fairfax Connector 423, 424, 493, 494, and 496 routes. The Tysons Corner Silver Line Metrorail Station is serviced by the Fairfax Connector 401, 402, 422, 423, 424, 482, 463, 721; and by Metrobus 2T, 23A, 28A, and 28X routes. Additional routes in the area include the Fairfax Connector 374 servicing the Spring Hill Silver Line Metrorail Station from the Reston Town Center Transit Station. More information can be found on the Fairfax Connector website, http://www.fairfaxconnector.com/ and the WMATA website, http://www.wmata.com/.



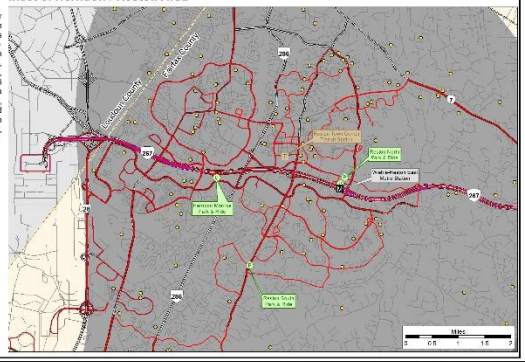
Inset 2: Arlington County

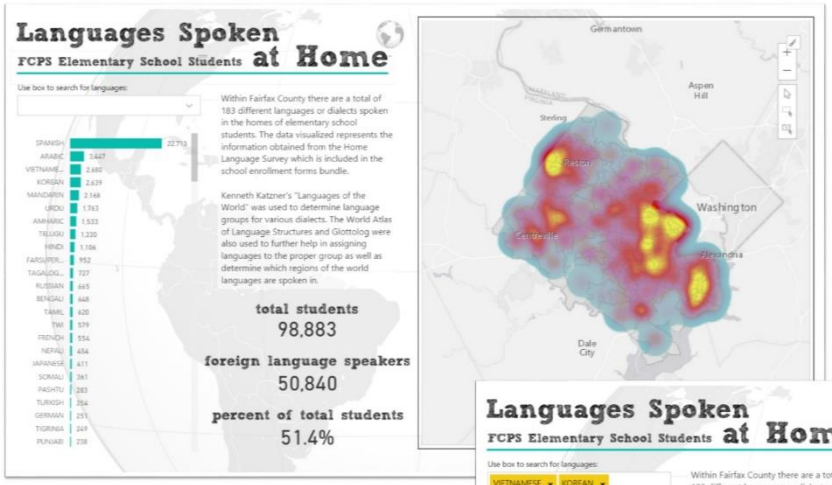
Inset 2 (Right): This inset displays a high density point-of-origin area for employees along the I-66 corridor of Arlington County. While Fairfax County does not maintain a database of transportation options for Arlington, multiple services are offered by Arlington County Transit (ART). Employees in this area can use the Metrorail Silver Line to reach the Tysons Corner Metrorail Station within walking distance to the new Ernst & Young office location. The Ballston Metrorail Station is serviced by Metrobus 1A, 1B, 2A, 10B, 22A, 22B, 22C, 25B, 28B; and ART 42, 51, 52, 53, 62, and 75 routes. More information can be found on the WMATA website, http://www.wmata.com/ and the ART website, http://www.arlingtontransit.com/.



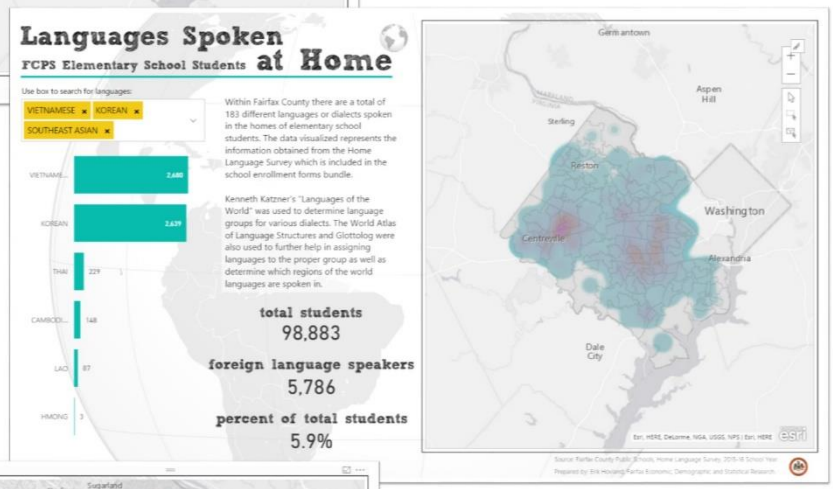
Inset 3: Herndon / Reston Area

Inset 3 (Right): This inset displays a low density point-of-origin area for employees in the Herndon and Reston areas. Metrorail Silver Line provides easy access to the new Ernst & Young office location. The Wiehle-Reston East Metro Station is serviced by Fairfax Connector 505, 507, 551, 552, 553, 554, 556, 557, 558, 559, 950, 951, 952, 980, 981, 983, RIBS 1, RIBS 2, and RIBS 3 routes. The Herndon Monroe Park & Ride is serviced by Fairfax Connector 551, 924, 926, 927, 928, 929, 937, 950, 951, 952, 980, 981, and 983 routes. More information can be found on the Fairfax Connector website, http://www.fairfaxconnector.com/ and the WMATA website, http://www.wmata.com/.

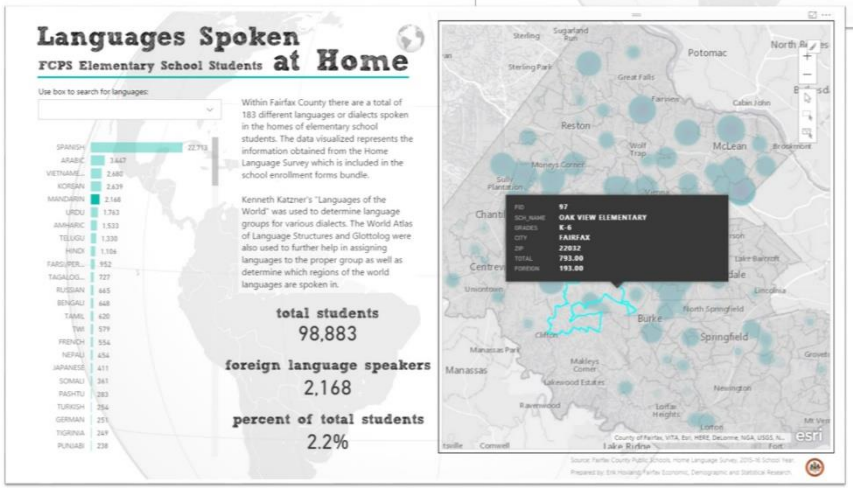




This interactive visualization was created with Microsoft Power BI, a user friendly drag-and-drop canvas that transforms, analyzes, and visualizes data. Languages Spoken at Home uses a stacked bar chart, dynamic cards, and an interactive heat map to illustrate where foreign language speakers are within Fairfax County. A tool that program planners could use to ensure that adequate services are provided across the county.



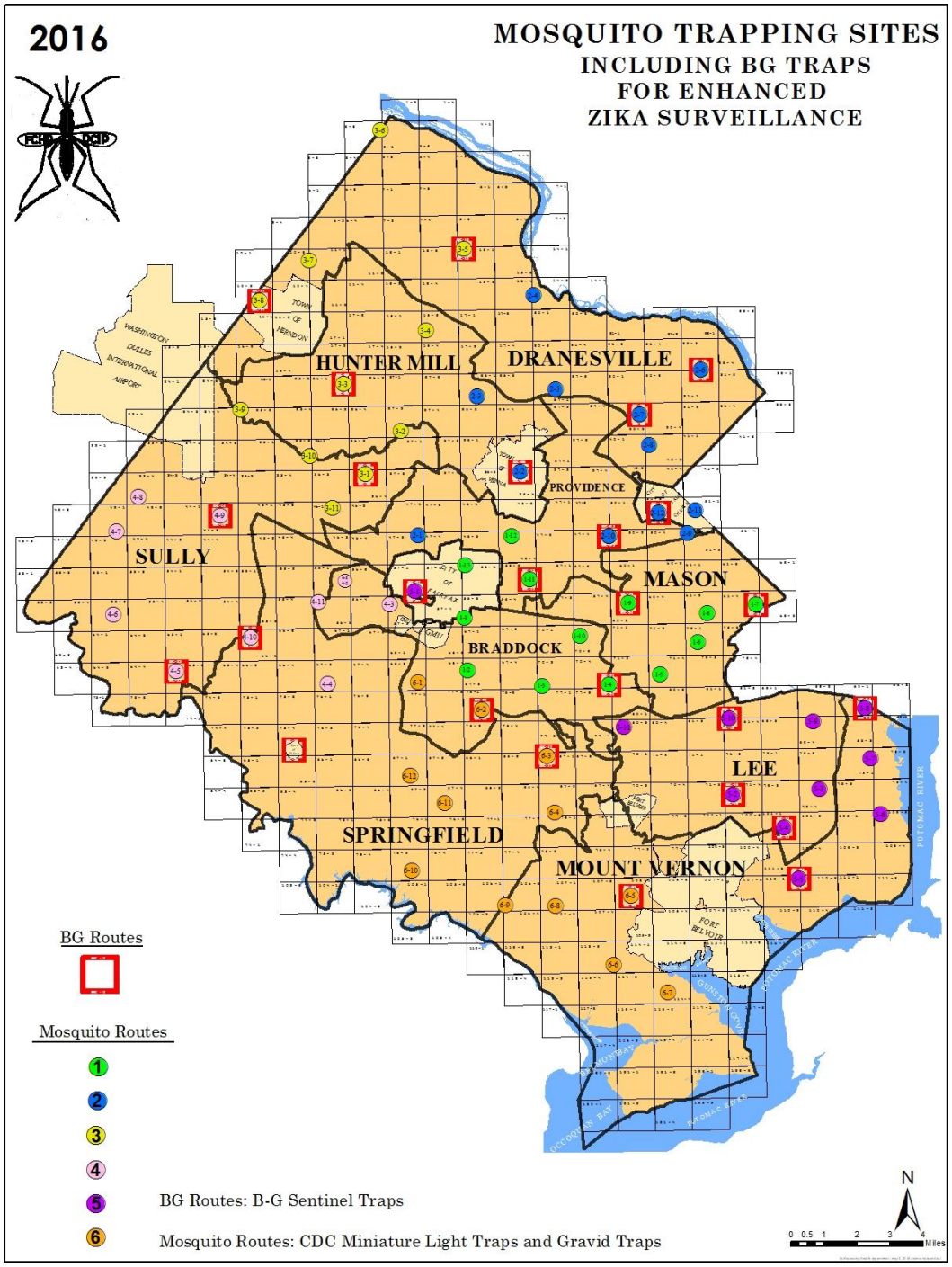
Languages Spoken at Home utilizes Power BI's Smart Filter which allows users to search for a language or select from the languages in the drop down list. Users can also select a language from the histogram below the search bar. When a language is selected the map and break-out figures will correspond to the selected language or language class.



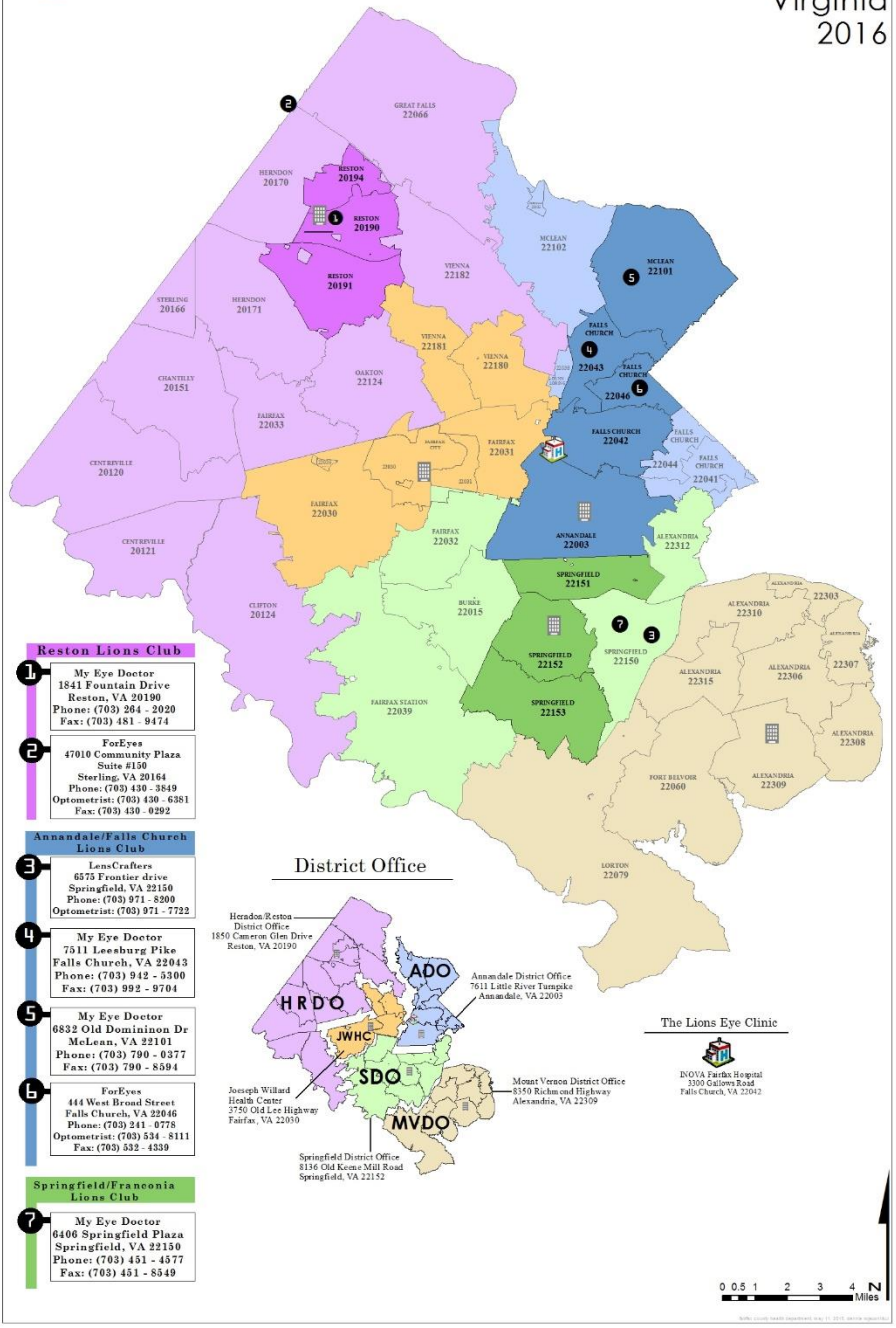
The ArcGIS Maps for Power BI tool connects to ArcGIS online to provided interactive maps and graphics. This connection lets you access a library of shared feature layers or load custom feature layers that you have created. When the map features are selected a pop-up with appear with the information contained in the ArcGIS online feature layer.

Fairfax County Economic, Demographic and Statistical Research

Prepared by: Erik Hovland


2016
MOSQUITO TRAPPING SITES
INCLUDING BG TRAPS
FOR ENHANCED
ZIKA SURVEILLANCE
FCMCP FCID
HUNTER MILL
DRANESVILLE
PROVIDENCE
SULLY
MASON
BRADDOCK
LEE
SPRINGFIELD
MOUNT VERNON
TOWN OF HERNDON
WASHINGTON DULLES INTERNATIONAL AIRPORT
CITY OF FAIRFAX
GMU
FORT BELVOIR
POTOMAC RIVER
BG Routes
Mosquito Routes
1
2
3
4
5
6
BG Routes: B-G Sentinel Traps
Mosquito Routes: CDC Miniature Light Traps and Gravid Traps
N
0 0.5 1 2 3 4 Miles

Eye Care Services
Fairfax County
Virginia
2016



Reston Lions Club

1. My Eye Doctor
   1841 Fountain Drive
   Reston, VA 20190
   Phone: (703) 264 - 2020
   Fax: (703) 481 - 9474
2. ForEyes
   47010 Community Plaza
   Suite #150
   Sterling, VA 20164
   Phone: (703) 430 - 3849
   Optometrist: (703) 430 - 6381
   Fax: (703) 430 - 0292

Annandale/Falls Church Lions Club

3. LensCrafters
   6575 Frontier drive
   Springfield, VA 22150
   Phone: (703) 971 - 8200
   Optometrist: (703) 971 - 7722
4. My Eye Doctor
   7511 Leesburg Pike
   Falls Church, VA 22043
   Phone: (703) 942 - 5300
   Fax: (703) 992 - 9704
5. My Eye Doctor
   6832 Old Dominion Dr
   McLean, VA 22101
   Phone: (703) 790 - 0377
   Fax: (703) 790 - 8594
6. ForEyes
   444 West Broad Street
   Falls Church, VA 22046
   Phone: (703) 241 - 0778
   Optometrist: (703) 534 - 8111
   Fax: (703) 532 - 4339

Springfield/Franconia Lions Club

7. My Eye Doctor
   6406 Springfield Plaza
   Springfield, VA 22150
   Phone: (703) 451 - 4577
   Fax: (703) 451 - 8549

District Office

Herndon/Reston District Office
1850 Cameron Glen Drive
Reston, VA 20190

Annandale District Office
7611 Little River Turnpike
Annandale, VA 22003

Joseph Willard Health Center
2750 Old Lee Highway
Fairfax, VA 22030

Mount Vernon District Office
8350 Richmond Highway
Alexandria, VA 22309

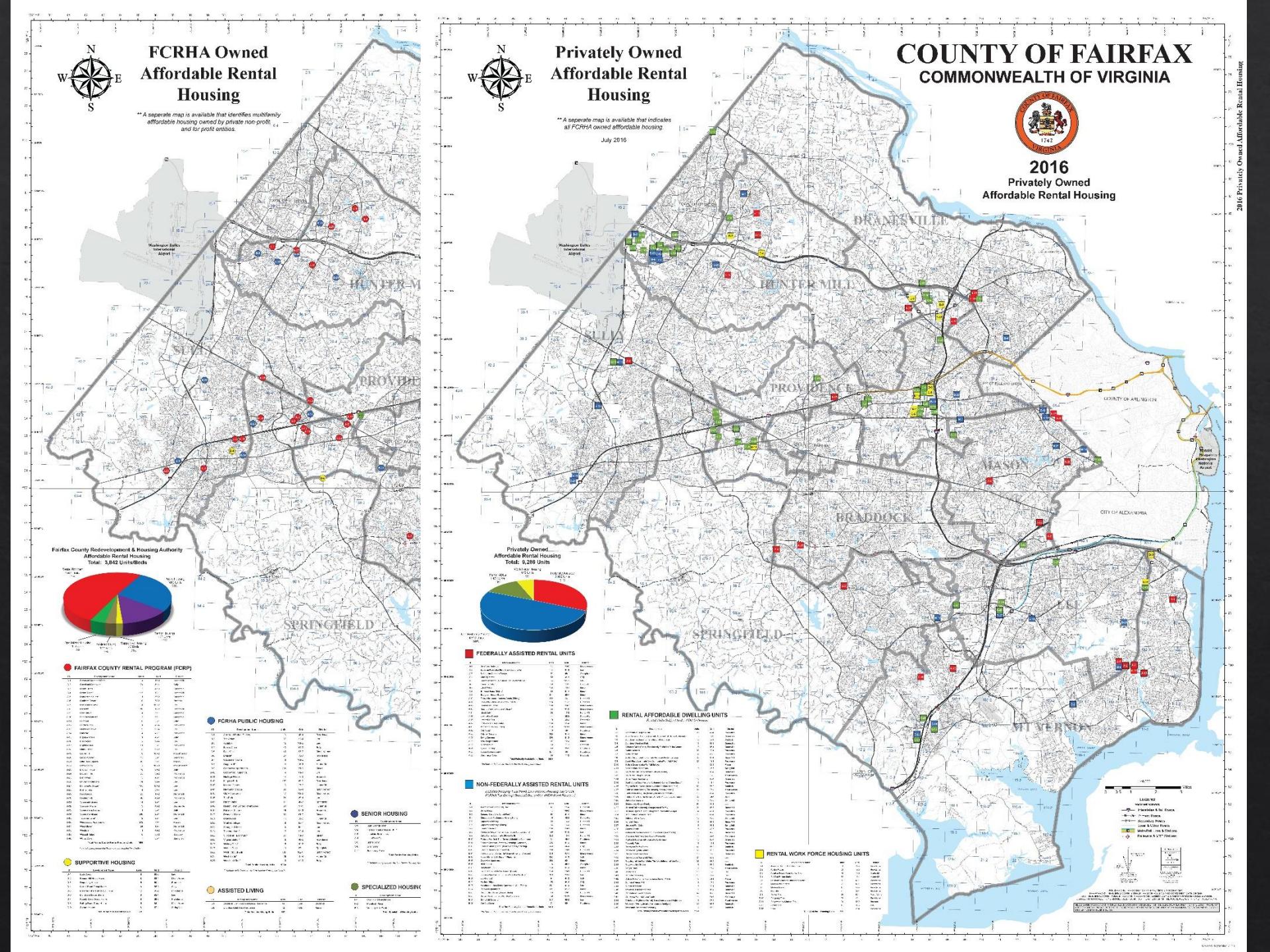
Springfield District Office
8136 Old Keene Mill Road
Springfield, VA 22152

The Lions Eye Clinic

INOVA Fairfax Hospital
3300 Gallows Road
Falls Church, VA 22042

0 0.5 1 2 3 4 Miles

N


FCRHA Owned
Affordable Rental
Housing
** A seperate map is available that identifies multifamily affordable housing owned by private non-profit and for profit entities.
Fairfax County Redevelopment & Housing Authority
Affordable Rental Housing
Total: 3,842 Units/Beds
FAIRFAX COUNTY RENTAL PROGRAM (FCRP)
FCRHA PUBLIC HOUSING
SENIOR HOUSING
SUPPORTIVE HOUSING
ASSISTED LIVING
SPECIALIZED HOUSING
Privately Owned
Affordable Rental
Housing
** A seperate map is available that indicates all FCRHA owned affordable housing.
July 2016
Privately Owned
Affordable Rental Housing
Total: 9,289 Units
FEDERALLY ASSISTED RENTAL UNITS
NON-FEDERALLY ASSISTED RENTAL UNITS
RENTAL AFFORDABLE DWELLING UNITS
RENTAL WORK FORCE HOUSING UNITS
COUNTY OF FAIRFAX
COMMONWEALTH OF VIRGINIA
2016
Privately Owned
Affordable Rental Housing
2016 Privately Owned Affordable Rental Housing
DRANESVILLE
HUNTER MILL
PROVIDENCE
SPRINGFIELD
MASON
BRADDOCK
LEE
MT. VERNON
COUNTY OF ARLINGTON
CITY OF ALEXANDRIA
Washington Dulles International Airport
Ronald Reagan Washington National Airport

Planning for the Future: Taking an Enterprise Approach to GIS at the Fairfax County Park Authority

During the past year, the Fairfax County Park Authority took a large step forward to improve its use of GIS at an agency-wide level. This was done to meet the agency's strategic plan goal of leveraging technology in order to utilize the best available tools for staff, provide easier access to agency information to the public and to increase business efficiencies. With the retirement of the individual in the agency's only GIS Analyst position (GIS Analyst I), the agency was afforded an opportunity to reclassify the position to a higher level GIS Analyst position (GIS Analyst III) and task the new individual with taking an agency wide approach to GIS. The key goal for this individual during their first year was to perform an agency wide assessment of the current use of GIS within the agency and to make recommendations on how to improve the use of GIS to streamline existing business processes and leverage GIS in new ways.

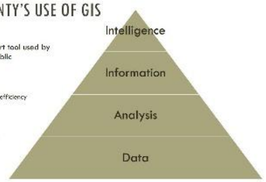
The assessment was executed during a 10 month period that included meeting with all agency GIS users to assess current and desired GIS use, an in-depth look at existing GIS data and applications and a comparison to how other county agencies are using GIS. A detailed multi-year work plan was created to track all of the projects and initiative recommendations that need to occur in order to leverage GIS at an enterprise level within the agency. Each of these projects and initiatives will result in the creation of new enterprise datasets, new online maps and applications, new spatial tools and analysis projects and a new training program within the agency. This work plan will take time to fully implement but by having a plan the agency now has obtainable goals identified and a way to reach them.

Justin Roberson, GISP

Fairfax County's Use of GIS

GIS is a decision support tool used by county staff and the public

Allows for:
- Cost savings from greater efficiency
- Better decision making
- Improved communication
- Better record keeping
- Managing geographically



Assessment of FCPA GIS

Interviewed FCPA staff to determine current GIS usage and future needs:
- Park Operations
- Natural Resources
- Cultural Resources
- Park Services
- Park Planning
- Land Acquisition & Survey
- Public Information

Assessed existing GIS data & applications

Acquired GIS usage metrics from DIT GIS

Performed comparison to other county agencies

Typical FCPA GIS Usage

Usage of GIS
- View a Map (Digital or Printed)
- Create a Map
- Query Data
- Collect or Create Data
- Perform Analysis
- Make Decisions

Types of GIS
- Desktop
- Mobile
- Web

Staff and the Public use GIS
- 37% of FCPA Staff are presently using GIS in some capacity

The Good, the Bad and the Ugly

Good
- Staff & Public want to use GIS tools & applications
- Staff do create and use maps & data

Bad
- Data and maps that are created do not follow modern GIS principles
- GIS is not used to its full potential due to lack of knowledge and training

Ugly
- Silos of information / disparate datasets
- Lack of standardized data

Existing FCPA Data & Applications

10 Enterprise Datasets
- Parks & Features
- Trails & Trail Structures
- Invasive Plants
- Deer

Web Applications
- Trail Buddy (1,000,000+ requests)
- Deer Management Program (600,000+ requests)
- Old Colchester Tour

Fairfax County Agency Comparison

FCPA is part of a larger county enterprise GIS
- We use other agencies authoritative data
- Other agencies use our data (limited availability today)
- Public uses our data (Open Data Portal)

Example Agency Enterprise Datasets
- Stormwater – 120
- Wastewater – 40
- Planning & Zoning – 35
- Transportation – 65
- Parks – 10

Now What?

Key Recommendation: **Centrally manage our agency-wide data in the county enterprise GIS to improve our shared intelligence**

How?
1. Assess current business processes and procedures
2. Identify opportunities to improve existing workflows
3. Design standardized datasets and configure applications
4. Implement and invest
5. Make better decisions to realize benefits and cost savings

Enterprise Dataset Creation & Management

Datasets are created with staff input based on business processes

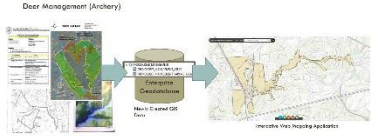
Key users will do the data creation/updates (data ownership)

May want to consider purchasing data (consultants)

Example: Planned Park Facilities & Zones
- Dataset created and designed by GIS Analyst
- Authoritative data maintained and updated by Park Planners
- Used by staff & public to answer:
  - Which parks have a master plan in an area?
  - How many ballfields are planned in a supervisory district?
  - Where are the resource protection zones and how do they connect?

Enterprise GIS Examples

Deer Management (Archery)



Enterprise GIS Examples

Prior to using GIS
- Lack of maps
- Many questions to staff via email
- Concerns over safety and liability (being on private property)

Now using GIS
- Hunters know where they can and cannot hunt
- Maps are available and updated in real time
- Data is available for other uses

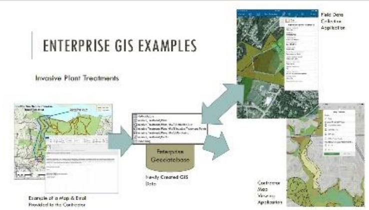
Process is now approx. 75% more efficient than before

Deer Management (Archery)

	Staff Hours per Year
Prior to GIS	120
GIS Year 1 / Implementation	90
GIS Years 2+	30

Enterprise GIS Examples

Invasive Plant Treatments



Enterprise GIS Examples

Prior to using GIS
- Email/PDF maps to contractor
- Site visits prior to treatment to convey goals
- Answer questions during treatment (property boundaries, extent of treatment)

Now using GIS
- No need for PDFs maps/endless emails
- More accurate treatments
- Maximize contractor time (double number of treatments)
- Treatment record in the database

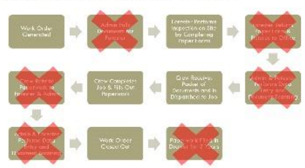
Process is now approx. 50% more efficient than before

Invasive Plant Treatments

Tasks	Staff Hours Pre-GIS per Park	Staff Hours Post-GIS per Park
Staff Site Visit	2	2
Write Treatment Plan	1.5	0.5
Site Visit with Contractor	2	0
Schedule Treatment	0.25	0.1
Answer Contractor Questions	0.5	0
Verifying / QC Treatment	2	2
Total Time Spent	8.25	4.6

Agency Benefits Realized

Opportunity: Forestry Operations



Opportunity: Land Records

Similar Issue in Stormwater
- Spent days to research easement questions
- Initiated 5 year effort with a contractor to map and digitize over 45,000 easement records
- Cost was $2-$3 million
- Most easement questions are now answered in minutes

Integration Opportunities

Tririga
- Take advantage of GIS module in Tririga
- Keep the two systems in sync
- Use GIS to help update data in the field for Tririga

ParkNet Replacement
- Perform analysis on customer data for marketing
- Map programs and classes

IrisBG (Horticulture)
- Spatially manage & update horticultural plant collections

Rediscovery (Archaeology/Collections)
- Manage archaeology surveys
- View artifact collections on a map

Application & Analysis Opportunities

FCPA Data in GEM
- Most used application by FCPA staff
- Currently, only park boundaries present
- Allow staff to answer their own questions

Field Data Collection
- 30% efficiency increase w/Invasive Prioritization
- Forces the standardization of data
- Enter data once

Marketing / Social Equity
- Targeted at certain demographics / customers
- Greater ROI by targeting our marketing efforts
- Meet the One Fairfax resolution and quality of life

Implementation Considerations

Equipment
- Desktop PCs
- Tablet Computers
  - iPads → Rugged Windows 10 tablets
- GNSS Devices

GIS Licensing & Infrastructure
- Coordination with DIT GIS

Enterprise GIS Maintenance & Reporting

Maintenance
- Data
  - Importance of keeping data up to date
- Applications
  - Using the best application for the task
- Training & Capacity Building
  - FCPA GIS user group
- Staff Needs
  - Efficiency savings will support new resources
  - Additional resource needs will be identified over time

Reporting
- What to report as measurable progress in the strategic plan?
- How often to report to leadership?

Priority Projects

Create Enterprise Ready GIS Data
- Standardize / Modify existing GIS data
- Create new datasets as determined by business processes
- Use in GEM

Leverage Mobile GIS
- Natural Resources
- Archaeology
- Park Operations
- Trails

Support Agency Master Plan Update
- Great Parks Great Communities & Plan Alignment
- Social Equity
- Master Plan Data

Land Records Management
- Create application and tools to aid in land records management
- Digitize existing land records (may require contractor support)

Tririga Integration
- Structure GIS data to work with Tririga
- Build the interface between the 2 systems

Modernize Park Operations Workflows
- Forestry
- Encroachments
- Nutrient Management
- Mowing

New GIS Uses
- Marketing (w/ Business Analyst)
- Education & Outreach

Technology
- Windows 10 Integration
- Identify Equipment Needs

Growth of Affordable Dwelling Units and Workforce Dwelling Units in Tysons, Virginia

Adaire

A development in Tysons that contains 80 Workforce Dwelling Units

Affordable Dwelling Units

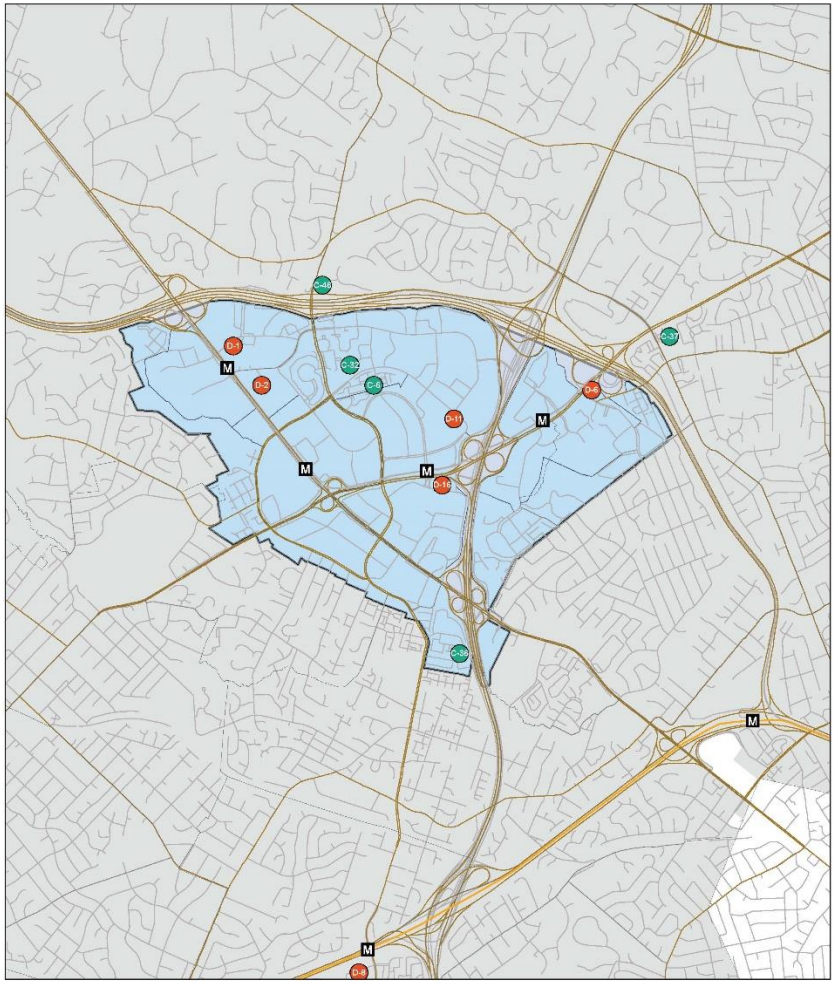
ID	Development Name	Units
C-6	Avalon Crescent	35
C-32	Ovation at Park Crest (aka Tysons Westpark)	4
C-36	Reserve at Tysons Corner	30
C-37	Residences at Lewinsville	18
C-46	Sunrise of McLean	6
C-47	Trevors Run at Dulles Center	11
C-49	Vantage at Merrifield Town Center	14

Workforce Dwelling Units

ID	Development Name	Units
D-1	Adaire	80
D-2	Ascent at Spring Hill Station	81
D-8	Modera Fairfax Ridge	11
D-11	Novelle	77
D-16	VITA	39

M Metrorail Stations

Metrorail (line)
- Blue
- Orange
- Silver
- Yellow
- Major Roads (line)
- Tysons



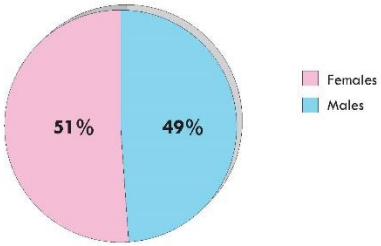
What is the Affordable Dwelling Unit (ADU) Program?
The Affordable Dwelling Unit (ADU) Rental Program provides qualified low and moderate income households the opportunity to live at a reduced rent in some of the newprivately-owned and privately managed market-rate apartment communities located in Fairfax County.

What is the Workforce Dwelling Unit (WDU) Rental Program?
The Workforce Dwelling Unit Program is designed to help working households afford to live in Fairfax County, near employment centers and transportation options - and avoid those long, expensive commutes. It is also available to retirees looking for a more urban lifestyle. In short, the WDU Rental Program can help you live near where you work or want to retire - and spend less time on the road.

Population in 2010: 19,627

Males: 9,610

Females: 10,017



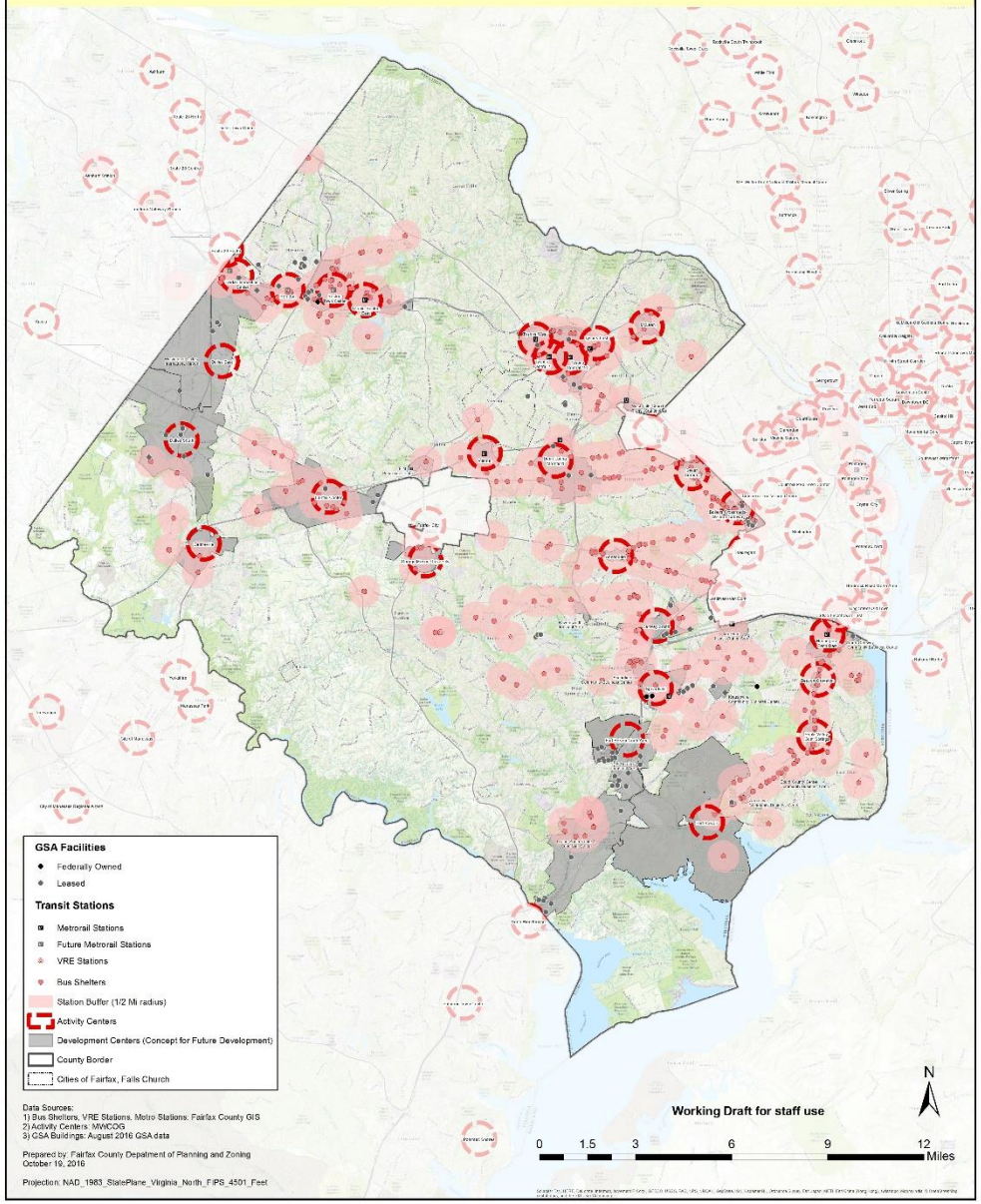
Median resident age: 35.3 years
Virginia median age: 37.6 years
Median gross rent in 2013: $1,837

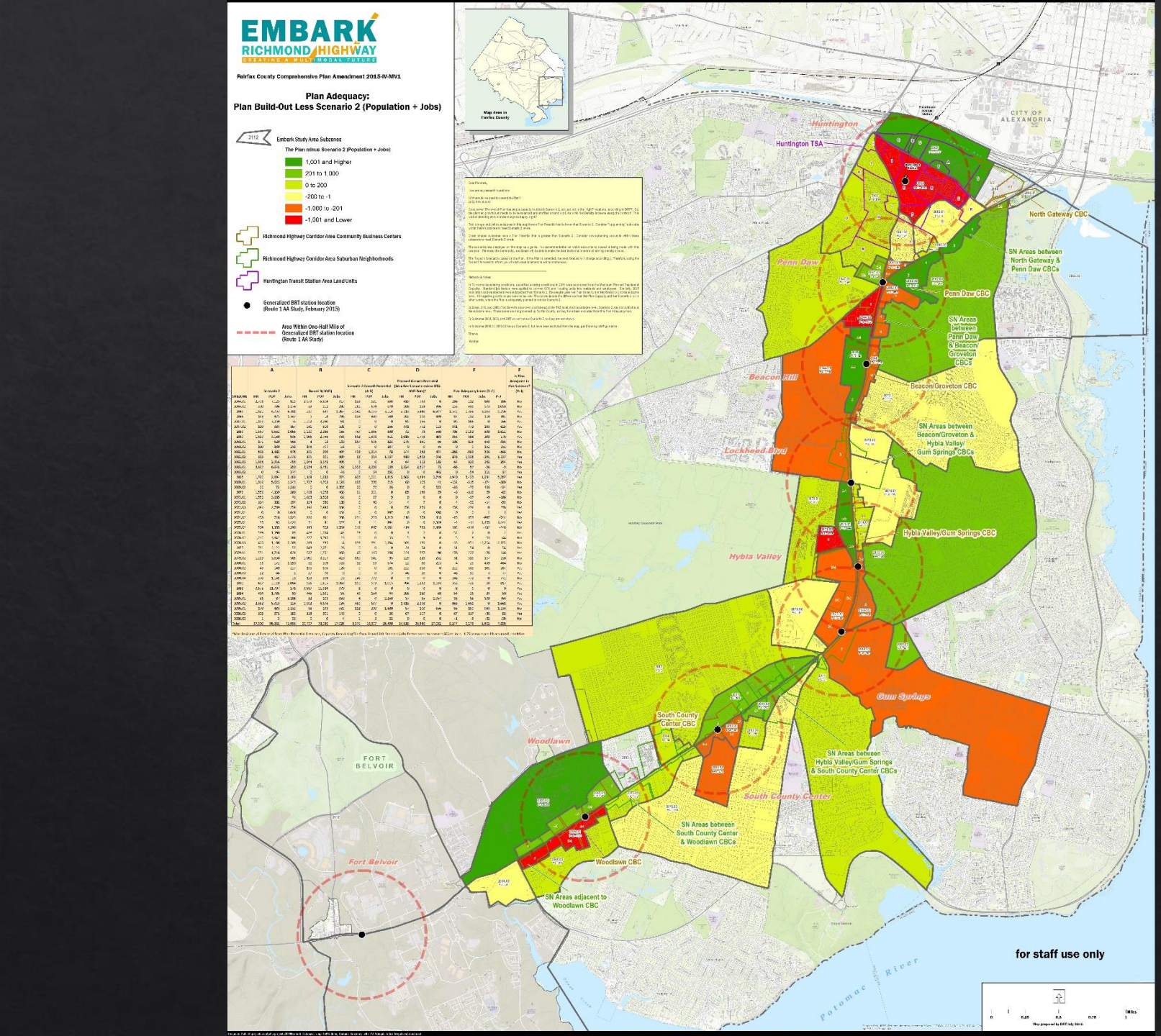
Estimated median household income in 2013: $101,878

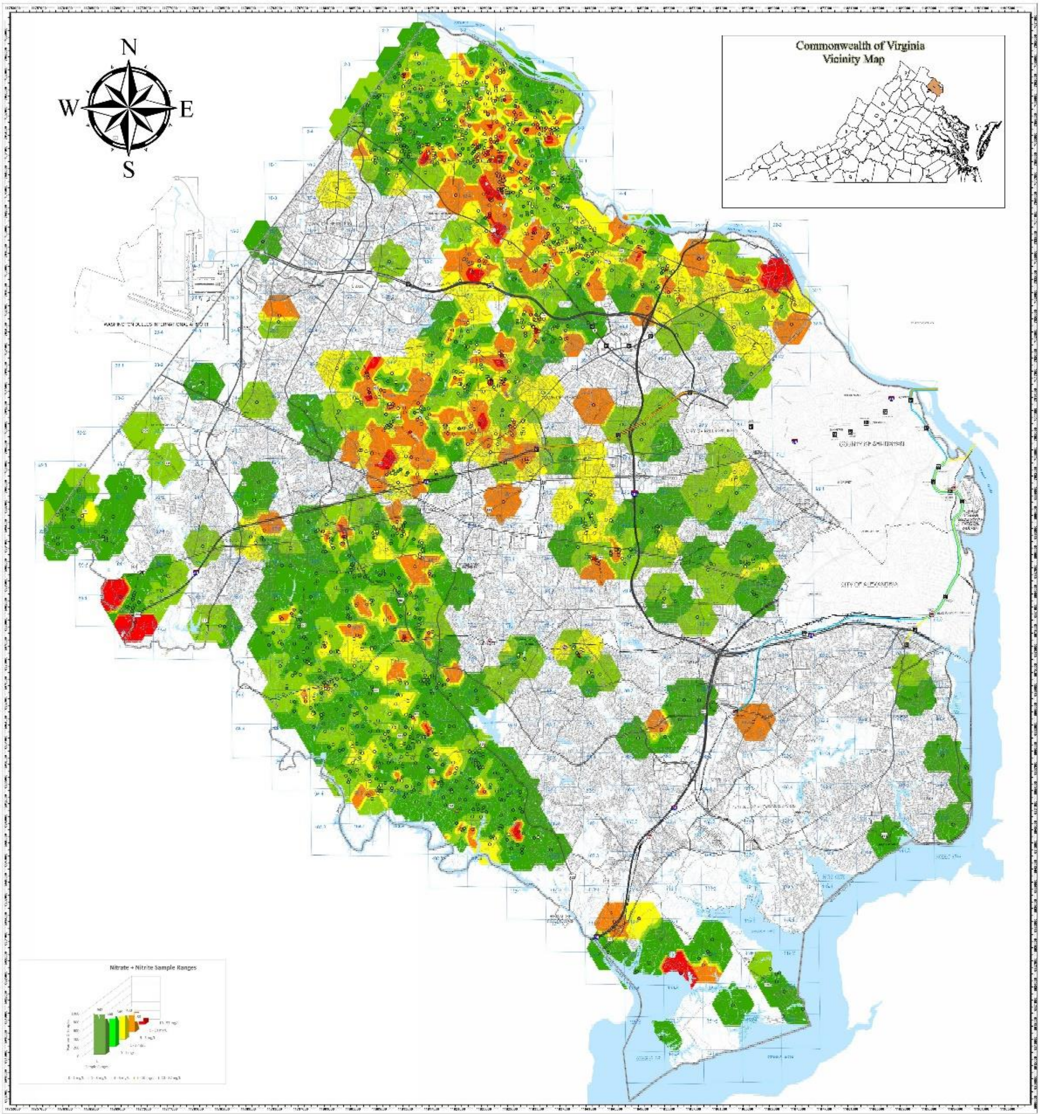
Estimated median house or condo value in 2013: $500,273

Census data from Census.gov

GSA Community Business Areas Project
Fairfax County, Virginia (DRAFT)




EMBARK
RICHMOND HIGHWAY
CREATING A MULTIMODAL FUTURE
Fairfax County Comprehensive Plan Amendment 2015-IV-MV1
Plan Adequacy:
Plan Build-Out Less Scenario 2 (Population + Jobs)
Embark Study Area Subzones
The Plan minus Scenario 2 (Population + Jobs)
1,001 and Higher
201 to 1,000
0 to 200
-200 to -1
-1,000 to -201
-1,001 and Lower
Richmond Highway Corridor Area Community Business Centers
Richmond Highway Corridor Area Suburban Neighborhoods
Huntington Transit Station Area Land Units
Generalized BRT station location (Route 1 AA Study, February 2015)
Area Within One-Half Mile of Generalized BRT station location (Route 1 AA Study)
Map Area in Fairfax County
Huntington
Huntington TSA
North Gateway CBC
SN Areas between North Gateway & Penn Daw CBCs
Penn Daw
Penn Daw CBC
SN Areas between Penn Daw & Beacon/Groveton CBCs
Beacon Hill
Beacon/Groveton CBC
SN Areas between Beacon/Groveton & Hybla Valley/Gum Springs CBCs
Lockheed Blvd
Hybla Valley/Gum Springs CBC
Hybla Valley
Gum Springs
South County Center CBC
Woodlawn
SN Areas between Hybla Valley/Gum Springs & South County Center CBCs
South County Center
SN Areas between South County Center & Woodlawn CBCs
Woodlawn CBC
Fort Belvoir
SN Areas adjacent to Woodlawn CBC
FORT BELVOIR
CITY OF ALEXANDRIA
Potomac River
for staff use only



Fairfax County, Virginia
Aquifer Nitrate+Nitrite as N
2001 to 2016

Legend

Well Location Samples 2001-2016

NO2+NO3 as N mg/L

- 0.00 - 1.00
- 1.01 - 3.00
- 3.01 - 5.00
- 5.01 - 9.99
- 10.00 - 57.31

Prediction Map

NO2+NO3 as N

Filled Contours

- 0.00 – 1.00
- 1.01 – 3.00
- 3.01 – 5.00
- 5.01 – 9.99
- 10.00 – 57.31

COUNTY OF FAIRFAX
1742
VIRGINIA

Coordinate System: NAD 1983 StatePlane
Projection: Lambert Conformal Conic
Datum: North American 1983
Angle: 20